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A Study of Enterprise-wide Risk Management and Risk Reporting Practices In UK Listed Companies

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A Study of Enterprise-wide Risk Management and Risk Reporting Practices In UK Listed Companies

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Abstract

Nowadays, it indeed becomes harder for companies to plot the right course for their continued success in this age of globalizations. Companies are sinking into more vulnerable position to risks as before and it would ultimately affect both operational activities of firms and decision making process of stakeholders. Therefore, practices of risk management and risk reporting have gained more attention from outside stakeholders, as well as academic community.

The study aims to find out the risk management performance and risk reporting practices among UK listed companies throughout the last five years, by focus on the 105 annual reports from 21 non-financial companies throughout financial year 2007 to 2011. The research objectives are respectively: (1), Research the ERM adoption level in UK listed firms, as well as its implementing level of the regarding organizational structure; (2), Examine the effects of ERM on firm's risk management performance and risk reporting practices; (3), and finally, Test the statistic correlation between firm's characteristics and its risk management and risk reporting practices.

The study starts with the broad review on risk and risk management literatures, and processes to the focused review on Enterprise-wide risk management and risk reporting conceptual literatures. The part of empirical study then proceeds in performing Content analysis, combined with different methodologies regarding each sets of developed hypotheses.

It is found that the implementation level of Enterprise-wide risk management has gradually increased during the last five years, but the related number of appointed CROs and risk committees has not consequently risen. The potential benefits of adopting ERM reflect in aspects of enhanced risk management performance and improved risk reporting practices among the firms. At last, empirical results regarding the third research questions further imply the logically positive correlation between firm size and firm's risk reporting practices, particularly in terms of the risk management performance, and the disclosed volume of different levels of risk disclosures.

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CHAPTER 1

Introduction

CHAPTER 1 - Introduction

As the dynamics of the market environment is ever changing for all countries, it indeed becomes harder for firms to plot the right course for their continued success. Other factor of globalization, makes today's business world becoming a borderless arena to compete. It is inevitable for firms to fall into a more vulnerable position to risks. Therefore, one fundamental concern is holistically evaluating and managing risks that faced by the firm.

Traditional risk management is limited to only threats of loss with a silo-based perspective. Such traditional ways of managing risks are no longer adequate in today's rapidly changing world in which the rules of wealth creation and preservation are ever evolving (Deloach and Temple 2000). Instead, one growing prominence approach called Enterprise-wide Risk Management (ERM) has caused rapid attention by enterprises and researchers. Nocco and Stulz (2006) highly valued the ERM as an integrated, holistic and value creating approach that can be used to manage risks in such imperfect dynamic market.

Not only a new risk management framework, but also an improved organizational structure that ERM brings into firms. The approach requires a top-down reporting process instead of a collaborative one (Pagach and Warr 2010). Thus, some dedicated and specialist expertises are crucial to ensure the risk information has fed back from the closest sources of risk (Dickinson 2001), and the senior managers are well informed when formulating the overall risk policy. A new coordinating management role of Chief Risk Officer (CRO) could help the adopted firm directly change its organizational structure regarding the ERM system.

There is a growing body of literatures that investigate the effects of ERM on organizational structure. Previous studies of Dickinson (2001) and Nocco and Stulz (2006) have identical suggested the inevitable adjusted organizational structure while implementing ERM. And Saeidi, et al. (2012) has also pointed out the view that the level of adoption of ERM depends on such factors which may influence firm's ERM implementations, in which including the support of appointing CROs. Limited literatures that address to investigate the adoption level of ERM within UK firms as well as its effect on firms' organizational structures include Gates (2006) and Paape and Speklé (2012), which have shown the significant grows in ERM adoption and comprehensive implementations.

Therefore, the first objective of the study is to research the ERM adoption level within UK companies in recent years, and further to explore the organizational structures of these ERM adopted firms, to ultimately examine the efficient implementation level of ERM system in the country of the study.

On the other hand, stakeholders' expectations regarding risk management have been rising rapidly, especially since the recent financial crisis. The most direct and effective way for outside stakeholders to get such risk management information is from firm's risk reports (Guthrie, et al. 2004). Efficient risk reporting practices enable the readers to prove their decision making process, and further alleviate the problem of 'information asymmetric'. Most importantly, the potential benefit of disclosing risks is the reduction in the capital cost, as investors become more confident in company's further performance (Linsley and Shrives 2000).

Thence, the association between risk management and risk reporting has attracted interests from financial and academic community. Indeed, risk management and risk reporting practices should be linked together to enable enterprises defining and guiding their overall risk profile, as well as obtaining more information related to risk factors, firm's business risk management, and potential impacts of risks on the future performance.

By linked with the above mentioned approach of Enterprise-wide risk management, the research problem of how this approach impacts on risk reporting is worth studying. As this integrated and consolidated approach requires adjusted organizational structure and changed risk categorization regarding its framework, thus, the huge influences on firm's risk disclosures and risk management performance are unavoidable.

Thus, the second objective of the study is to explore the correlation between ERM implementation and firm's risk reporting and risk management practices. Unlike the first research question of the study, the second research question is grounded with a few literatures. This is quite a new area of research, and the findings might be unprecedented and contributed.

Last, by deeper investigating into risk reporting in UK companies, the actual practices are still in a varying stage for companies in different backgrounds and characteristics. There are hundreds of sectors in different industries listed in London Stock Exchange (LSE), with

various consumer scopes and operational activities. The risk management performance and risk reporting behaviours are indeed varying among firms.

From previous studies, general disclosures level has found to be positively correlated to firm size (Firth 1979, Beattie, McInnes and Fearnley 2004, Beretta and Bozzolan 2004, Hossain and Hammani 2009). There are also evidences about the positive correlation between company size and risk management performance practices.

Consequently, the last concerned objective of this paper is to verify the statistic correlation between the firm specific characteristics and its risk management performance and risk reporting practices.

Proposed Method and Plan

By summary, the objectives of this study are respectively to: (1), Research the ERM adoption level in UK listed firms, as well as its implementing level of the regarding organizational structure; (2), Examine the effects of ERM on firm's risk management and risk reporting practices; (3), and finally, Test the statistic correlation between firm's characteristics and its risk management and risk reporting practices.

With respect to the study's research questions, the proposed research method has to be academic founded and literatures suggested. For considerations of examining risk reporting practices within the firms, annual reports are selected in this study because they are the most useful sources of getting risk management information in firms (Guthrie, et al. 2004, Beattie, McInnes and Fearnley 2004). The scope of the study is focus on 105 annual reports from 21 companies listed in London Stock Exchange (LSE) from financial year of 2007 to 2011, in order to oversee the adoption trend of ERM in UK companies during the years.

Content analysis will be utilized in the study, as the most popular and efficient analysis method researching the annual reports (Elo and Kyngas 2007). The unit of analysis is 'sentences' based, combined with a single coder methodology. A designed questionnaire will be used to efficiently convert the qualitative information in annual reports into quantitative date for following empirical studies. Scores will be evaluated and given regarding to each annual report's risk information, and finanlly to be the measurements of each company's risk management and risk reporting performances. Meanwhile, the volomes of risk disclosures will be also recorded and calculated in the process of coding annual reports.

The scores and the volumes of risk disclosures will be all input into later statistics tests. Appropriate statistic tests that examine the correlations between ERM and risk reporting, firm size and risk reporting are including the 'Wilcoxon signed-ranks test' and 'Pearson correlation coefficient test. They are the two academic sounded and literature grounded tests in area of risk reporting studies.

After outline the research method, a brief study plan is addressed below and is chapter based:

The study will start from the introduction chapter 1, to provide inspirational background, objectives, brief description of research methodology, and the proposed plan of the study. Chapter 2 and 3 will separately review the broad literature of the study's background, and the focussed literature of which this study mainly concerns.

Chapter 4 will come to next, which briefly elaborates the hypotheses development process. And chapter 5 would detailed introduce the study's sampling process, the research method and related empirical methodologies. Also, potential limitations of the data and the selected methodology will be noted at the end of the chapter 5.

The results and analysis will be addressed in chapter 6, which will exhibit the overall practices first, and further test the developed hypotheses. The reasons and explanations of such findings would be analysed in chapter 6 and chapter 7 respectively. While the chapter 7 is the ultimate section of the main body of the study, which not only includes the discussion of the results, but also the conclusion and limitations of the study.

CHAPTER 2

Background of the Study

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2.1Literature Review on Risk and Business Risk

As Culp (2001) said: "Risk is everywhere, and you do not have to look very hard to find risk". As a matter of concept, the term of risk has a variety of definitions in business and everyday life (Harrington and Niehaus 2003).

One definition set out in 'ISO 31000 Risk Management Principles and Guidelines' in 2009 is that risk is the effect of uncertainty on objectives, and the uncertainties are caused by ambiguity or a lack of information. This definition relates risks to both positive and negative impacts on objectives, which allows it to be applied appropriately when the firm's objectives and strategies are clear and comprehensive.

Also, Banks (2004) defined risk in a more general form as *uncertainty associated with a future outcome or event*. To apply it into business terms, it can be concluded that risk is the expected variance in profits, losses, or cash flows arising from uncertain events.

For business risk considerations, due to the various uncertainties in markets, failures of projects, lack of credit, accidents and unpredictable events, companies are exposed to a wide of short, medium and long-term business risks. Therefore, companies have to control and retain these risks in the normal course of business. Further researchers that have classified these business risks include Harrington and Niehaus (2003), which have categorized risks facing businesses into three classes: (1), Price risk; (2), Credit risk; and (3) Pure risk.

The classifications of business risk vary in literatures. Reviewing different views of risk categorizing would benefit the later research in classifying primary risk disclosures in firm's reports.

For example, in Banks (2004), the business risk is broadly classified into operational risks and financial risks. Particularly, the best-known and most widely managed forms of *financial risk* facing a company are market risks, credit risks and financing/liquidity risks (Meulbroek 2008; and Banks 2004). The perspective of financial risk in the book of Culp (2001) is based on the type of event that leads a loss, which particularly defines the main financial risks facing businesses as: (1) Market risk: refers to the risks arise from the event of a change in some market-determined asset price, reference rate (e.g., LIBOR), or index; (2)

Financing/Liquidity risk: occurs in the event that the current balances and cash inflows are insufficient to cover cash outflows; and (3) Credit risk is the risk of the actual or possible non-performance by a firm.

2.2 Literature Review on Risk Management

Cost of Risk and Value Maximizing

After reviewing the definition and categorization of business risk, managing the risk in order to prevent the organization from the losses, is the daily issue of business.

Regarding the various kinds of risks, they lead to different forms of losses. As for corporate/organizational risk management, Culp (2001) defined risk management in organizations and companies as "the reaction to risk as they attempt to ensure that the risks to which they *are exposed* are the risks to which they think they *are exposed* and *want to be exposed*." Therefore, it requires most risk management decisions must be made before the *losses* and *the cost of losses* are known and are exposed.

By understanding the cost of risk and realizing the potential losses, firms could minimizing these costs and prevent themselves from losses, and further to enhance a firm's value. A firm's value depends on the expected future net cash flows as well as the risks related to these cash flows (Harrington and Niehaus 2003). Because most investors are risk averse, they are less willing to purchase the stock of the firm if the risk of cash flows rises, which further results in firm value reduction. In other words, as long as minimizing the cost of risk, the value of firm would increase, along with an increased shareholder return.

Therefore, making appropriate risk management decisions under the considerations of maximizing firm value and shareholder wealth is the same thing as minimizing the cost of risk. It can be concluded that the overall objective of risk management is to minimize the cost of risk (Harrington and Niehaus 2003).

Historical Views of Risk Management

Based on the understanding the cost of risk, enterprises could design their particular organizational risk managements aim to pursue the firm value. However, it takes a long time for such researchers and enterprisers finding their most favorite risk management approach. Indeed, the historical views of risk management and organizational risk managements have

continuously improved and developed since the concept of risk management put forward in the late 1940s (Dickinson 2001)

During the 1950s to 1980s, many of the researchers have indicated their varied views of risk management. In 1964, Williams and Heins defined the risk management is "*a process of minimization of adverse effects of risk at minimum cost through identification, measurement and control*". Next in the 1970s and 1980s, the insights offered by finance theory started to be reflected in views of risk management. For example, Olson and Simkiss (1982) had viewed risk management as a specific aspect of financial management and valued it as much as any other financial discipline.

The development and revolution of risk management have significantly contributed and reflected the finance theory in 1990s. However, even risk management obtained unprecedented innovations in 1990s, it still existed many debates against the effectiveness of risk management. It was argued that the earlier view of risk management was lack of clear understanding about what risk management retails and led to a seemingly chaotic variety of risk management perspectives (Chew 2008; Culp 2001).

The importance of risk management has been gradually realized in modern society, up to date, the risk management could be viewed as a way of thinking what permeates through an organization and improves its decision-making and planning processes.

During the same time, the concept of 'Organizational Risk Management (ORM)' was firstly put forward by Smith and Young (1998) as "*A general management function that seeks to identify, assess and address the causes and effects of uncertainty and risk on an organization*".

Nowadays, the term of 'organizational risk management' has been given the same or similar meanings as 'business risk management', 'corporate risk management', 'enterprise risk management' and other risk management approaches that concern about managing the business risk within an entity.

The concept of ORM was therefore combined with *corporate governance*, which had been regulated and listed in the Cadbury Report in 1998. In the report, it raised the profile of risk management and argued that risk management should have a monitoring role that linked to corporate governance. In UK, the idea was reflected into the London Stock Exchange's

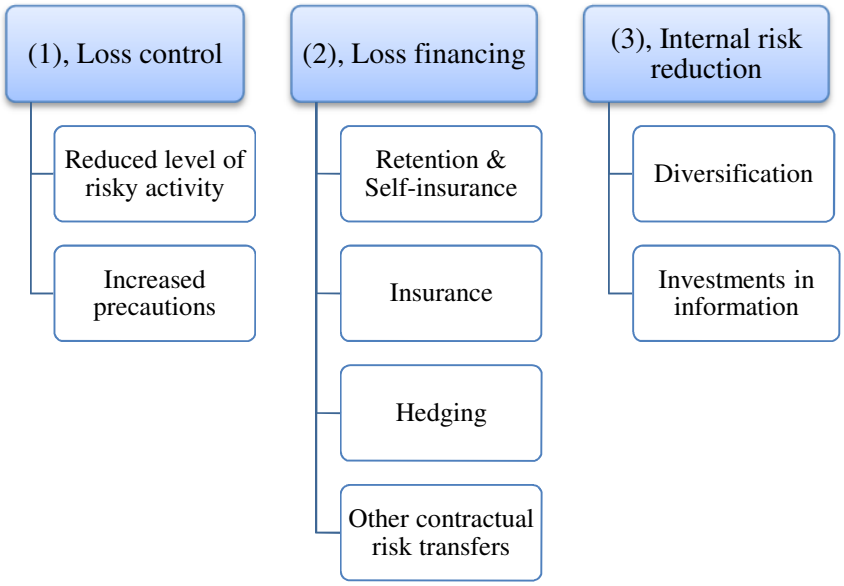
Combined Code (1998) and the Turnbull Report (1999) respectively, which represented a significant risk management innovation.

Risk Management Process and Method

Based on the concept of ORM set out by Smith and Young (1998), an ORM process could be followed as: (1) Mission identification, (2) Risk and uncertainty assessment; (3) Risk control; (4) Risk financing or transferring; (5) Implementation or administration; and finally (5) Evaluation or feedback.

The general framework of ORM process should apply in methods of managing risk, which are not mutually exclusive, could be diagrammatically divided into three major types:

Figure 2.2 -Three Major Risk Management Methods



Source: Harrington and Niehaus (2003) Risk Management and Insurance, P9.

Commonly, methods of (1), loss control and (3), internal risk reduction include decisions of investing resources to reduce losses; while (2), loss financing decisions concern about how to pay for losses if they do occur (Harrington & Niehaus 2003).

From the view of organizational risk management, some large modern companies have a specific risk department with an appointed Chief Risk Manager (CRO) that responsible for managing risks within the firm. Given the complexity of modern risk management, as well as the differences in firm size, institutional ownership and other characteristics, the establish of risk department and the appointment of CRO varied among different industries and firms.

2.3 Literature Review on Risk Reporting

Regulatory Background

The debate of risk disclosure in UK can be traced back to 1998. The Institute of Chartered Accountants in England and Wales (ICAEW) published the paper – *Financial reporting of risk-proposals for a statement of business risk*, which was built on the principle that directors should be reporting upon risks and managing these risks in a coherent manner to let the shareholders and other readers of the annual report could understand the full risk picture for the firm (Woods 2011).

At the same time, an increasing number of studies including Schrand and Elliott (1998) and Solomon, et al. (2000) were calling for more work for enhancing the understanding of risk disclosure and empirical evidence, which suitable for testing theoretical frameworks. This call indeed promoted the work in this area, and most of the empirical work was focused on corporate risk disclosure.

Later, ICAEW (1999, 2000) had continually issued two guidelines, respectively named as *No surprises: the case for better risk reporting* and *No surprise: working for better risk reporting*, which both suggested the directors to voluntarily prepare a business risk statement for inclusion within the annual report and to discuss the benefits of disclosing risk information. Consequently, until 2010, 84% of FTSE 100 companies in UK had an ICAEW Chartered Accountant on the Board (ICAEW 2011).

So far to date, many professional bodies in different countries have recognized the importance of risk disclosure and have issued related discussion papers as well as risk reporting guidelines. Some other authorized professional bodies include: International Accounting Standards Board (IASB) and Canadian Institute of Chartered Accountants (CICA).

Benefit and Cost of Risk Information Disclosure

The rational of above regulations is not only to ensure the orderly risk information disclosing practices, but also to promote the sustainable development of entities. By regulating the risk information disclosing in annual report, a firm could benefit from transparent risk disclosures in many aspects:

- Improved firm's risk management ability;

- Enables the external shareholders to scrutinize firm's risk management system;
- A reduced cost of equity of capital can be received by communications for risks and risk management throughout the firm;
- Provides an opportunity for a decision maker to obtain an incremental improvement in assessing the real prospects of an enterprise.
- And consequently, provides directors incentives to report their decision making processes, and further to explain the potential impact of the changing risk profile on business value (Botosan 1997; Elliott and Jacobson 1994; Hail 2002; Linsley and Shrives 2005).

However, some disclosure is immaterial in cost. In fact, frivolous and misleading risk disclosures in reporting practices entail more costs than benefits. Nevertheless, it truly has observed such evidences of lacking risk disclosures in companies' reports and accounts (Höring and Gründl 2011; Linsley, Shrives and Crumption 2006).

By summarizing the previous arguments in Höring and Gründl (2011) and Linsley, Shrives and Crumption (2006), the two main reasons of unwilling to provide risk information are:

(1) Managers might worry they would become liable, once the inaccurate risk information is disclosed, and enables the investors to make decisions depend on these information;
(2) Releasing such commercially sensitive risk information might generate competitive disadvantage for companies, which is also referred as the *proprietary cost* of disclosures that cause potential risks.

CHAPTER 3

Literature Review on Enterprise-wide Risk Management and Risk Reporting Practices

CHAPTER 3 - Literature Review on Enterprise-wide Risk Management and Risk Reporting Practices

3.1 Enterprise-wide Risk Management

Definition

As discussed earlier, many of the risk management approaches turning up successively in decades, but the most influential one throughout the early decades is *traditional risk management*.

However, in many organizations, risk management, as a function is limited to only threats of loss, because many of these traditional views tend to ignore the opportunity inherent in every risk. So far to date, managers emphasize on considering alternative to the traditional way of purchasing insurance as risk management method. It is proposed in literatures that traditional risk management approaches are no longer adequate in today's rapidly changing world in which the rules of wealth creation and preservation are ever evolving (Deloach and Temple 2000).

A new-born approach called 'Enterprise-wide Risk Management' (ERM) is well received by large modern organizations in recent years, and has gradually replaced the traditional risk management.

The Committee of Sponsoring Organizations of the Treadway Commission (COSO)[1] defined Enterprise Wide Risk Management (EWRM) as well as the standards in its 2004 ERM framework[2] as "*…a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives*."

The particular term 'enterprise' suggests the organisations should consider the risks that include a variety of factors with potential impact on entity's activities, processes and resources. This requires the organizations to manage the risk with the view of 'overall business strategy' and links business strategy to day-to-day risks.

[1] American Institute of Certified Public Accountants, American Accounting Association, Financial Executives International, The Institute of Internal Auditors and the Institute of Management Accountants

[2] Contained by the report of introducing EWRM approach that aims to enhance organizations' ability to manage risks and improve value-creating ability, leading by PriceHouseCoopers.

Benefits and Value Creation

Apparently, from its definition, the key terms in ERM are 'strategy-related', 'integrated and consolidated risk reporting', 'continuously risk assessment and evaluation', and 'integrated and holistic implements throughout the firm'.

Therefore, the four basic distinguishing features and characteristics of ERM beyond traditional risk management and other approaches are:

- ERM seeks to consolidate exposure types not only across financial risks but also across non-financial perils and hazards;
- ERM views overall risks within a company through forms of common lens.
- ERM attempts to organizationally consolidate the risk management process across systems, process, and people.
- Finally, the risk managers adopted ERM are constantly seeking for more integrated risk management products and solutions. (Prakash 2002; Culp 2002; Smithson and Simkins 2005; Nocco and Stulz 2006; Aabo, Fraser and Simkins 2005; and Olson and Wu 2008)

ERM emphasizes on prioritization of risks and focuses on shareholder wealth maximization by aligning risk with firm's objectives and strategies. This enables the companies pay enough attention on business management, as opposed to crisis management.

Organizations could also benefit from adopting ERM in receiving a reduced net volatility of cash flow and earnings, to further obtain decreased WACC and increased share price. An integrated and holistic risk reporting process requires a better understanding of risk management by different levels of group members. Therefore a better company-wide resource allocation would be achieved, along with a more accurate pricing process by incorporating risk into pricing decision (Harrington and Niehaus 2003).

Specially, Nocco and Stulz (2006) explained how ERM created shareholder value stated that ERM creates value through its effect on companies both at a '*macro*' (or company-wide level) and a '*micro*' (or business-unit level). At the macro level, by enabling senior management to quantify and manage the risk-return tradeoff, ERM creates value by maintaining access to the capital markets and necessary resources to implement business strategies and plans. At the micro level, ERM provides a new way of communication. It is because a well-designed ERM system should ensure all material risks are 'owned' and risk-

return trade-offs are carefully evaluated, and it should be achieved by effective communication among operating managers and employees throughout the firm. The empirical results support that Enterprise Risk Management would increase firm's value by 3.6% and 17% (Liebenberg and Hoyt 2008).

Additionally, a lesson learn from the global crisis is the importance of *creditworthiness*. This is where ERM comes into play. The authoritative security rating agencies of Moody's, Standard and Poor's (S&P) have taken account of ERM adoption in their rating methodologies (Aabo, Fraser and Simkins 2005). In 2008, S&P widened the scope of its analysis of non-financial companies in 17 different industries, aim to find out how companies identify and manage key risks.

Organizational Structure and Risk taxonomy

ERM requires a top-down approach instead of a collaborative one (Pagach and Warr 2010), the chief executives have to appoint a dedicated and specialist expertise to ensure the information is fed back from the closest sources of risk and senior managers are well informed when formulating the overall risk policy (Dickinson 2001). Thus, a new co-ordinating management role is crucial - the Chief Risk Officer (CRO).

The framework of the ERM organizational structure can be shown as Figure 3.1a. To describe in details, they are CEO, CFO, CRO and other senior executive committees who deciding the strategies and the associated risks within the firm, with the resources and information provided by CFO and CRO. The decisions made by the group have to backward controlled and guided by CFO and CRO, and further to report to the board of directors as well as the audit committee.

Specially, like showed in the figure, the responsibility of a CRO is not only about managing risk. As discussed earlier, except the role of managing risk, CRO must maintain close links with firm' other executives, such as Chief Financial Officer (CFO), who inevitably be the senior executive in strategic planning committee.

Furthermore, in order to evaluate the job of a CRO, the Chief Executive Officer (CEO) must attempt to determine how well the company's risk is understood and managed (Aabo, Fraser and Simkins 2005; Saeidi, et al. 2012). Besides, an audit committee (or board risk committee) formed by board of directors is often used as an additional governance tool to better implementing ERM (COSO 2004).

Figure 3.1a - ERM Organizational Structure

Source: Dickinson, 2001. (Where the dotted line with two-way direction states for 'co-ordination and information exchange'; and the solid line with one-way direction states for 'setting risk policy guidelines and controls.)

Figure 3.1b- ERM risk taxonomy[3]

Source: Based on Meulbroek , 2008.

Except the changed organizational structure, the conventional risk categorization will also be changed since the company implementing ERM. Cabedo and Tirado (2004) categorized a company's risks based on ERM risk taxonomy into four types, which is also adopted by

[3] The risk categorization is mainly based on Meulbroek (2008), which is the foundation for risk classifying process in later research methodology. More detailed risk categories are shown in Figure 5.4.

Linsley and Shrives (2005), Linsley and Shrives (2006) and Linsley and Lawrence (2007) in the researches regarding risk reporting practices in companies.

From the Figure 3.1b above, the ERM category is similar to the risk classification discussed earlier, but obviously has fuelled the emphasized on *strategic risk* management.

Specially, Frigo and Anderson (2011) indicated the strategic risk management is *focus on the most consequential and significant risks to shareholder value* – clearly an area deserving the time and attention of executive management and the board of directors. Indeed, over the last ten years, risk management of business risk include operational risk, reputational risk and most recently, strategic risk (Nocco and Stulz 2006). The emphases on managing strategy risk in ERM framework requires the ERM users to reform and improve their current risk identification, risk measurement, risk controlling and other ORM processes listed previously during implementing ERM system.

An extent of studies aim to research the exposed strategy risk in modern companies, including the survey of (Funston 2004) that used to investigate how top executives identify and manage primary business risks, with a sample contains 100 companies that had experienced large losses (stock selloffs) in 10 years. The results show that 37 of the companies have experienced financial risks, and 66 present suffered strategic risks, along with the conclusion that strategic risk links closer to firm performance compared with financial risk. Because the high component of strategy risk in the volume of business risk, the investigated companies have adapted many approaches in deal with the potential losses caused by strategy risk including legal risk, reputation damage and competition. Indeed, the heightened need for strategic risk management has impacted the risk taxonomy of ERM.

Current Situation of ERM Adoption

Since ERM is a relatively new approach and has not been fully accepted in companies, there is little academic researches aim to analysis the drivers, obstacles and influences of implementing ERM.

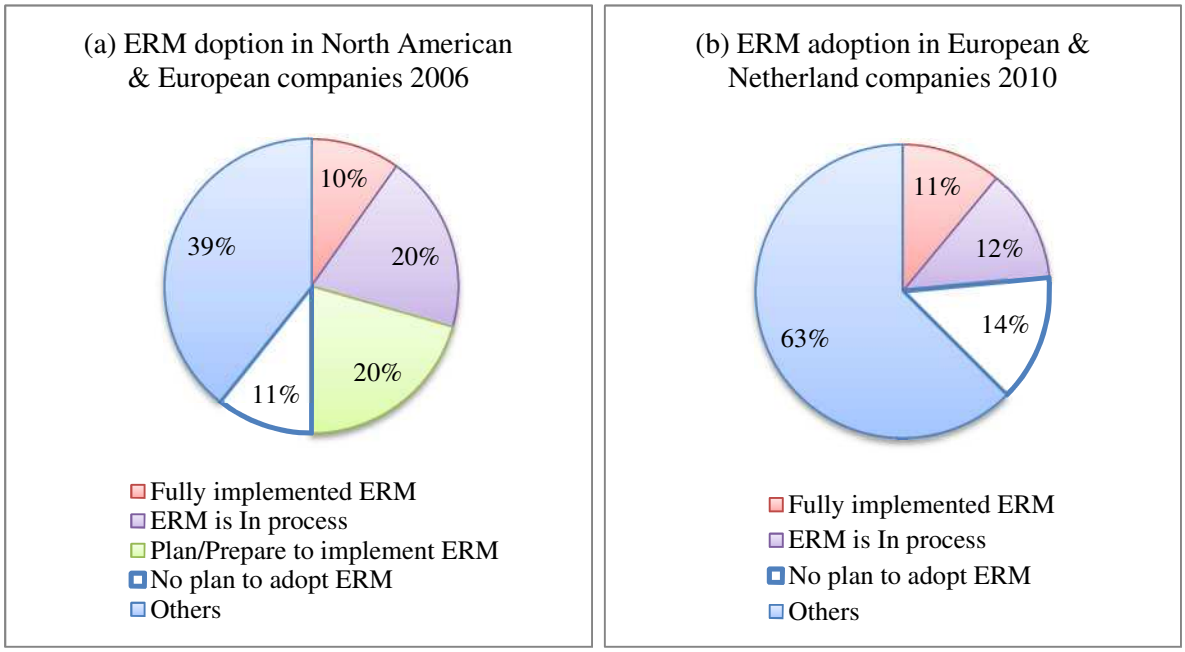
Limited literatures include Gates (2006) survey of 271 North American and European companies to research current practice of ERM, has showed its results of only 11% of investigated firms have fully implemented comprehensive ERM, while 22% of them are actively engaged in the process, and 23% are in the planning and preparation phase. The figures support the conclusion that a majority of companies have launched the ERM process,

but the implementing levels are varied depending on the industrial differences and other firm-specific characteristics.

Another survey by Paape and Speklé (2012) has investigated the extent of ERM implementation based on data of 825 European and Netherland organizations, had showed the results that 11% of the observed have a fully functional ERM system in place, while 12.5% are currently in implementing process, and 14% of them do not seem to have a systematic and proactive approach to ERM.

On the whole, it can be concluded that ERM is gradually known and accepted at global as well as UK level. An overall view can obtain in below pies:

Figure 3.1c - ERM adoption in (a), North American & European companies; and (b) European & Netherland companies



Source: Based on (a) Gates (2006); (b) Paape and Speklé (2012)

After summarizing the big picture of ERM adoption, it is also necessary to overview how these ERM adopted companies use ERM system since fully implemented. The surveys and researches of actuarial committees could be the professional and authorized references. Such publishes of these agencies or committees including CAS (2003)[4], CERA (2007)[5] and IFA

4 In 2003, the Enterprise Risk Management Committee of the Casualty Actuarial Society (CAS) issued its overview of ERM to guide companies implementing ERM framework.

(2009)[6]. Most data and information are collected from direct channels, such as interviews with CROs or members of risk audit committees.

Particularly, in the survey named 'Life Insurance CFO' carried out in 2011 by The Actuarial Profession, it shows that companies have *gradually recognized* ERM as a critical issue and are building capabilities within their organizations to address it. Briefly, the surveys and studies have all showed their evidences that most companies have significantly enhanced their risk management since the ERM is fully implemented, and most of them feel they are at least reasonably well prepared for their immediate risk management needs.

The overviews regarding the current adoption level of ERM and its implementation level within these adopted firms are crucial for later hypotheses development process. It can be concluded by this review that a majority of companies have launched the ERM process, but the implementing levels are varied depending on the industrial differences and other firm-specific characteristics.

3.2 Risk Reporting

Nowadays, boards of directors and management teams have been learnt and recognized ERM a lot lately, which potentially reflects in the enhanced risk management performance and risk reporting behaviours that ERM brings into the enterprises. After summarizing the central idea of ERM, the study proceeds to the focused review, with respect to firm's risk management and risk reporting practices.

Risk Disclosures Reporting

The last chapter has broadly reviewed the regulatory background, benefits and costs of reporting risk information. Flexibility is, however, left under these historical guidelines as to how and where those disclosures are made in the annual report and accounts.

The identical definition of such *qualified* disclosures is *the quality of disclosure depends on the quantity of information disclosed and the richness offered by additional information*,

5 In 2007, the Society of Actuaries developed the Chartered Enterprise Risk Analyst (CERA) issued the first professional credential regarding ERM. The studies of CERA are mostly focus on how various risks, including operational, investment, strategic, and reputational combine to affect organizations.

6 The Institute and Faculty of Actuaries (IFA) is the professional body representing actuaries in the United Kingdom. In March 2008, Enterprise Risk Management was adopted as one of the six actuarial practice areas, reflecting the increased involvement of actuaries in the ERM field.

according to Linsley, Shrives and Kajüter (2007); Woods, Linsley and Kajüter (2008); and Walker (2009).

As discussed earlier, in order to effectively fulfil the demands of shareholders and stakeholders, listed companies have to increase the volume of disclosed information in their annual reports, of which concerning the expected risk-related future profits. Just as suggested in the International Accounting Standards Board (IASB 2009) that: *management should disclose its principal strategic, commercial, operational and financial risks, being those that may significantly affect the entity's strategies and development of the entity's value*.

In fact, by compare and contrast the risk reporting practices in UK and US, UK firms disclose more risk information, which regarding the respects of risk, uncertainty and forward-looking information (Linsley, Shrives and Kajüter 2007).

For corporate risk reporting considerations, the risk disclosures are disaggregated into *business, financial, and internal control* according to Abraham and Cox (2007). In order to better researching the relationship between ERM and risk disclosure in later methodology, it is necessary to review the reporting regulations of these three risk disclosures in the country of the study - UK.

Business Risk Reporting

The regulatory history of business risk reporting in UK can be traced back to the earlier 1990s. The Operating and Financial Review (OFR), also the equivalent of the Management Discussion and Analysis (MD&A), had established a voluntary and principle-based framework to guide business risk reporting in 1993. Even the OFR is non-mandatory, but it enables companies to provide a formalised, structured and narrative explanation of financial performance (Jones, 2002). Later, the Reporting Standard (RS) had subsequently superseded the OFR and issued the new guideline in 2005, to coincide with the statutory reporting requirement for quoted companies to publish an OFR for financial years on or after 1 April 2005 (FRC 2007).

On the other side, the Combined Code on Corporate Governance was required listed companies to maintain a sound system of internal control and explain how it works in their annual reports. Until 2012, three revised codes are successively issued in July 2003, June 2008, and May 2010, with terms of consequential rule changes.

Financial Risk Reporting

Besides, ICAEW (2002) listed a number of risk-related information requirements in its risk reporting guidelines, including the FRS 13 '*Derivatives and other financial instruments: disclosures*'. The FRS 13 requires entities to provide information about the impact of financial instruments and other products on the entity's risk profile (ICAEW 2002). Also, the FRS 13 encompasses narrative and numerical aspects in its reporting obligations. The requirements in FRS 13 are described by initial companies as 'to be challenging' and difficult to understand in the first place (McIIwraith and Dealy 2000).

In 2005, the revised FRS 25 superseded and replaced the FRS 13, and implements the international standard IAS 32 and covers both presentation and disclosure requirements. The ASB issued an amendment to FRS 25 in 2008, to change the classification from liabilities to equity and to ensure the FRS 25 remains converged with International Accounting Standard No. 32 (IAS 32). The latest FRS 29 replaced the FRS 25 in 2007. Subsequently, ASB amended the FRS 29 in 2011 to improve the disclosures on transfers of financial assets.

However, the debate regards to financial risk reporting insisted that disclosing current financial risks will not provide comprehensive and efficient information about a firm's financial status, because financial performance is also affected by strategic and operating risks (Beretta and Bozzolan 2004). In highly regulated countries including United Kingdom, current reporting regulations tend to focus either on primarily market and credit risks and those connected with the use of financial instruments (Young and Guenther 2003).

Internal Control Risk Reporting

Considering only in United Kingdom, the compulsory risk reporting on internal control effectiveness of public listed companies began in 1992 with the Cadbury Committee's report on the financial aspects of corporate governance (Linsley, Shrives and Kajüter 2007). As the UK Combined Code on Corporate Governance issued in 1998, the compulsory reporting on the broader started covering all aspects of internal controls. One the other hand, the Turnbull Report on Internal Control revised internal control risk reporting in 1999.

Successively, the Combined Code was revised and updated regularly in 2003, 2006 and 2008. In 2010, a new Stewardship Code was issued by the Financial Reporting Council (FRC), along with a new version of the UK Corporate Governance Code. In this latest Combined Code, the changes made aim to enhance the board's performance, increase accountability to

shareholders, improve risk management and align performance-related pay to the long-term interests of the company (Belcher, Fenner and Stocks 2010).

By reviewed, it can say that UK's risk reporting regulations is history grounded and based. Apart from regulations, on the side of academic research, many studies have indicated that UK companies still disclose quite little about risk information in its operating and financial review.

For example, ICAEW (1998) reported the results that less than 13% of sampled companies have properly clarified groups' current business situations that could influent future performance, and only 18% did have explained such relevant risks of its core operation that could affect future operations.

Board Risk Committee

Saving the regulations, the rational of risk reporting regulations could also be achieved by establishing a board risk committee within the company. In the final recommendations of Walker (2009), it suggests that a Board risk committee is closely attentive to against the possibility of a heady mix of enthusiasm for the mooted transaction on the part of the CEO and the investment banking adviser.

In the annual reports, it should contain a separate section of the board risk committee (or board) risk report, which thematically describes the entity's risk management strategy, including the current and potential future risk exposures of the Entity, as well as the associated risk appetite and tolerance over time (Walker 2009).

3.3 Association between Enterprise-wide Risk Management and Risk Reporting

Risk management standards issued by mentioned professional organizations have identical interested in the development of risk management systems (for example, Association of Insurance and Risk managers, 2002).

Nevertheless, the fact is that such risk management gaps exist in most UK companies during decades. The enhanced emphasis on risk reporting indeed appeals the directors and managers to try their best to upon risk in greater depth.

Just right, the appearance of Enterprise-wide risk management truly provides such risk managers and directors a new framework of managing risk. The high speed of implementing

ERM makes more and more companies interested the approach, and further better understand companies' business risks.

Thence, the association between risk management and risk reporting has attracted interests from financial and academic community. Indeed, risk management and risk reporting practices should be linked together to enable enterprises defining and guiding their overall risk profile, as well as obtaining more information related to risk factors, firm's business risk management, and potential impacts of risks on the future performance.

As discussed earlier, in order to comprehensively establish a group-wide risk managing system, and finally achieve the maximum positive results. This integrated and consolidated risk management approach requires firms to adjust its organizational structures and risk taxonomy regarding the ERM framework. Inevitably, generates such influences on companies' risk reporting practices. Therefore, it is meaningful to investigate the effects of ERM on firm's risk reporting practices.

Overall, based on the review literatures on Enterprise-wide risk management and Risk reporting, the research questions regarding how ERM impacts on risk reporting is worth researching. As this integrated and consolidated approach requires adjusted organizational structure and changed risk categorization regarding its framework, thus, the huge influences on firm's risk disclosures and risk management performance are unavoidable.

It is predicted by this study that the adoption level of ERM approach has gradually increased recently, and its high speed of implementation among non-financial companies leads to the potential influences on firm's risk management performance and risk reporting practices. Some other factors including the firm size, has also produces significant impact, along with the ERM approach.

CHAPTER 4

Hypotheses Development

CHAPTER 4 - Hypotheses Development

4.1 Introduction

After reviewing the literatures regarding Enterprise-wide risk management and risk reporting practices, the study obtains adequate backgrounds and foundations that required for progressing hypotheses formation.

In order to answer the research questions of the study, several hypotheses are developed individually aim to: (1), Research the ERM adoption level in UK listed firms, as well as the implementing level of regarding organizational structure; (2), Examine the effects of ERM on firm's risk management and risk reporting practices; (3), and finally, Test the statistic correlation between firm's characteristics and firm's risk management and risk reporting practices.

For the first research question of hypothesis 1, the study will use the appointed CROs or risk committees as the indicators of adoption ERM. In other words, the company with a CRO or a risk committee implies the implementation of the ERM, along with a comprehensive organizational structure regarding ERM system. Supported academic literatures will be discussed later.

Like introduced in the first chapter, the study will use the Content analysis combined with a single coder methodology to identify the qualitative information from annual report and convert them into quantitative data (i.e. scores). This approach provides a quantitative measure of management based on predefined qualitative targets or benchmarks that risk management efforts should aim to achieve (Carren˜ o, Cardona and Barbat, A Disaster Risk Management Performance Index 2007).

Therefore, hypotheses of 2 and 3 are developed based on the Risk Management Index (RMI) designed by the study, which particularly refers to a designed *risk management performance questionnaire*. The questionnaire provides the quantitative measure of firm's management performance, and presents it as the evaluated scores and the calculated volumes of risk disclosures.

Last, in order to test the correlation between firm's characteristics and firm's risk reporting performance, hypotheses 4 and 5 are developed. By chosen the variables of the test, the study

will specifically focus on the correlation between firm size and firm's risk management performance scores and the numbers of disclosed risks.

Each hypothesis or a set of hypotheses would come after a literature review or discussion, which has helped the development of the hypotheses.

4.2 Hypotheses set 1: ERM Adoption and ERM Organizational Structure

In developing the ERM framework, COSO (2004) recognized that the appropriate ERM system would likely vary from firm to firm. But an identical view from prior is that it is inevitable to change the organizational structure of the firms which are implementing the ERM (Dickinson 2001, Liebenberg and Hoyt 2003, Nocco and Stulz 2006, Pagach and Warr, 2011).

As an integrated and holistic risk management, ERM requires the companies appointing a senior executive who is part of the top strategic planning team. The assumption that CRO appointments signal adoption of ERM is fundamental to the study. It is supported by extant publishes that the announcement of a CRO appointment is a signal that the firm is establishing an ERM program, and these appointed CRO would be charged with the responsibility of implementing and managing the ERM program.

Alternatively, a risk committee built up by managers from different levels could be an equivalent of a CRO. Or, the responsibilities of implementing ERM might be separated into the jobs of incumbent CFO or CEO (Fraser and Simkins 2010, Pagach and Warr 2011).

In this study, no matter which action made by the company, it identically implies the company is in the process of implementing (or has already established) ERM system. Therefore, the investigation on whether a firm is ERM adopted or ERM un-adopted could be explored by seeking the keywords signaled implementing ERM. However, with respect to the firms which processing the ERM with lack of established CROs or risk committees, the study will do the further analysis for the reasons.

From previous literatures, Hoyt and Liebenberg (2008) and Wan, Yazid and Hussain (2010) have respectively investigated the influence of CRO on ERM. One study had examined the quality of CRO on the level of ERM adoption (Wan, Yazid and Hussain 2010), which found out a positive relationship between quality of CRO and level of ERM adoption. While the

research of Hoyt and Liebenberg (2008) was conducted in 275 insurance companies, and present their outcomes that 125 companies had ERM activities and among them they found 15 companies had CRO, where 8 companies announced the appointment of CRO.

Back to the study's researching scope and objectives, the first set of hypotheses is developed to oversee ERM adoption level in UK listed firms, as well as the implementing level regarding the organizational structure:

H1 (a)*: The number of firms that reporting the implementation of Enterprise-wide Risk Management is increased throughout the year 2007 to 2011.*

H1 (b): *The number of appointed CRO or Risk Committees is same as the number of firms that reporting the implementation of Enterprise-wide Risk Management.*

4.3 Hypotheses 2 and 3: The Effects of ERM on Risk Reporting

As discussed earlier, a series of regulations and guidelines have published and issued in order to improve the risk reporting practices in firms' reports. Because, it is not only shareholders of the company, but also the company itself could benefit from better risk disclosures reporting by providing transparent risk management information to public.

In addition, Linsley et al, (2008) had explained the correlation between risk disclosures reporting and firm's risk management performance indicated that, companies benefit from improved risk information reporting by a reduced cost of finance, as well as reduced asymmetry information. In long-term, an efficient risk management approach implemented by firms will potentially improve the risk reporting performance. Therefore, it is meaningful to find out the influences of ERM on firm's risk reporting practices.

After examining the ERM adoption level in hypotheses set 1, the study will divide the sampled firms into two groups, one is ERM firms, and the other is non-ERM firms. The 'Wilcoxon signed-rank test' will be utilized by the study to examine the statistic differences between these two groups.

Risk Management Performance and the Volume of Risk Disclosures

The volumes of disclosed risk are selected by the study as an important indicator of assessing risk management performance. As suggested in The ICAEW (1999), the companies disclosing more risk information would find that the marketplace better understands the

company's risk position, and the companies are then deemed to be less risky than before. Therefore, in the study, firms with higher volume of disclosed risks will be valued higher scores regarding better risk management performance.

Prior studies that use the number of risk disclosures as measurement of firm's risk management performance include Ernst and Young (2003) and Maziol (2009). Particularly, the later study is similar to this study, Maziol aimed to investigate the risk management behaviors in ERM organizations, had provided evidences of significant improvement in business results and risk management performance during implementing ERM system.

Thus, in order to examine the effects of ERM on firm's risk management performance and risk reporting practices, the study has developed a set of hypotheses, which respectively uses the measures of: (a), the scores evaluated according to the designed RMI questionnaire[7], and (b) the numbers of disclosed risks in firm's reports[8]:

H2 (a): *The average scores of risk management performance in the reports of ERM firms will be significantly higher than the reports of non-ERM firms throughout 2007 – 2011;*

H2 (b): *The total number of risk disclosures in the reports of ERM firms will be significantly higher than the reports of non-ERM firms throughout 2007 – 2011.*

Financial and Non-Financial risk disclosures in Firms

After testing the volume of risk disclosures within firms as a whole, the study will further focus on the different kinds of risk. It is meaningful to find out the differences in disclosing risks between ERM firms and non-ERM firms. In the study, the risk disclosures are broadly divided into two groups: Financial and Non-financial.

The reason of this classification is that financial risk reflects the normal course of firm's business, including market risks, credit risks and financing/liquidity risks (Banks 2004, Meulbroek 2008). Since they are quantitative in nature, these financial risks are readily measurable by arithmetic scales, which are invented specially for risk quantification, for example, Value at Risk (VaR) and Expected Shortfalls. Therefore, financial risk disclosures are separate particularly from other risks to measure how the firm managing risks.

[7] Questionnaire provides the quantitative measure of firm's management performance, and presents it as the evaluated scores.

[8] Firms with higher volume of disclosed risks will be valued higher scores regarding better risk management performance.

Based on the literatures, it is inevitable for ERM adopted companies to change their habitual risk management approaches, and leads to a changed pattern and adjusted volumes of risk disclosures.

Thus, the study predicts the firms implementing an enterprise-wide risk management might have a significant different risk reporting behaviors than others. Therefore, the hypothesis H3 (a) is developed:

H3 (a): *The average number of 'financial' risk disclosures in ERM firms will be significantly higher than in non-ERM firms throughout 2007-2011;*

To complete the examination of risk disclosures between ERM firms and non-ERM firms, non-financial risk disclosures should also be included. Like reviewed in literature, after dividing financial risk out, non-financial risk disclosures include operational risks, strategy risk, hazard risk and other risks. Various risks reported by firms can reflect the different aspects of how they identify and measure risks. Thus, the assumption on level of non-financial risk disclosures shall be built in the same trend:

H3 (b): *The average number of 'non-financial' risk disclosures in ERM firms will be significantly higher than in non-ERM firms throughout 2007-2011.*

4.4 Hypotheses 4 and 5: The Effect of Company's Size on Risk Reporting

The last objective of the study is to verify the statistic correlation between firm's characteristics and its risk management and risk reporting practices. According to the evaluated scores and calculated numbers of different risk disclosures, the study will examine the statistic correlation between the variable of firm size and the risk management scores, as well as the volumes of disclosed risks.

Risk Management Performance and the Volume of Risk Disclosures

The correlation between firm size and firm's risk reporting is supported by both 'Agency theory' and 'Legitimacy theory'. It suggested by these two theories that larger companies are normally performed diverse operated activities, which would produce greater impact on society as a whole.

Thence, larger firms with high level of business profile and larger operational scope are more likely to attract investors. They must perform better risk reporting to satisfy such stakeholders

and investors' desire to understand how the firms operate and run. Therefore, the study predicts a positive correlation between firm size and risk management performance.

On the other hand, the positive association between firm size and the number of risk disclosures is verified in succession by Hackson and Milne (1996) and Beretta and Bozzolan (2004). Both studies have investigated the impact of company size on corporate risk disclosures in European companies. Later in 2006, Linsley and Shrives have addressed a study regarding the same area, and has concluded that larger companies are more likely to provide high volume of risk information because of the more responsibilities to different stakeholder groups.

In this case, the study assumes that bigger firms are more likely to have outstanding risk management performance than smaller firms. And further predicts a statistic positive correlation between firm size and firm's risk reporting practices Therefore, the next hypothesis of H4 (a) is developed:

H4 (a): *A positive relationship between company size and the scores of risk management performance;*

H4 (b): *A positive relationship between company size and the volume of risk disclosures.*

Financial and Non-Financial risk disclosures in Firms

As suggested earlier, firms' financial and non-financial risk disclosures could reflect different operational activities. It could be postulated that firms with higher levels of risk might disclose greater amounts of risk information because the directors have to explain the causes of this higher risk (Linsley and Shrives 2006).

Therefore, it can say that bigger firms with higher complexity level and more market values would report greater amount of higher risk than smaller firms. Then, the study predicts that bigger firms are more likely to disclose different levels of risks in their annual reports.

Thus, the last set of hypotheses is built:

H5 (a): *A positive relationship between company size and the total number of financial disclosures;*

H5 (b): *A positive relationship between company size and the total number of non-financial disclosures.*

CHAPTER 5

Research Methodology

CHAPTER 5 - Research Methodology

5.1Research Approach

Extant researches are generally using two kinds of approaches: (1), *Deductive* research approach, which allows the research to establish a hypothesis first according to theoretical literatures, with a variety of collected data and information to confirm or reject the hypothesis and further to resolve issue (Johnson and Gill 2010); (2), *Inductive* research approach is more flexible, which has no requirement of pre-determined theory to collect data and information. By observing data and facts, the researchers reach at tentative hypothesis and finally define a theory as per the research problem (Mertens 2008).

In this study, the first *Deductive* research approach is adopted. Because a deductive approach is useful if the general aim was to test a previous theory in a different situation or to compare categories at different time periods (Elo and Kyngas 2007), which is exactly matched the objectives and proposed research method in case of this study.

5.2 Sample Selection

Annual reports are highly useful sources of information, because companies' managers commonly signal what is important through the reporting mechanism (Guthrie, et al. 2004). Annual reports also have the advantages of being regularly produced and offering opportunities for a comparative analysis of management attitudes and policies across reporting periods (Beattie, McInnes and Fearnley 2004). Therefore, the sample in this study mainly contains 105 annual reports of 21 companies that listed on London Stock Exchange (LSE) by the end of 27st July, 2012. Particularly, in order to answer the first section of research question, the 21 companies are randomly sampled based on sectors and industry differences.

5.3 Sampling Process

The 105 annual reports are all from the *Non-financial* companies. The reason of selecting non-financial companies is that they are less likely to make significantly different types of risk disclosures than the financial companies (Linsley and Shrives 2005).

To enhance the reliability of the study, the chosen non-financial industries or sectors must to be significantly different from each other, with different customer groups, resource bases and operation activities. Therefore, the 21 companies are from 21 different sectors, the final

sampled companies are listed in Figure 5.3 below. In the sampling process, the companies with similar services would not be chosen at the same time, such as Premier Food plc. and Hilton Food Group plc.

As for the firm size, the study improves the reliability and validity by randomly sampled the companies. Finally, in order to research the trend in ERM adoption, a research time period of year 2007 to 2011 is adopted for collecting the companies' annual reports. Because of the different accounting periods used by firms, the 105 reports are identically selected with the same accounting period that ends closest to the date of 31st December.

Figure 5.3 - Sampled Companies

	Company Name	Sector
1	Britvic plc.	Soft Drinks
2	Mondi plc.	Paper Products
3	Premier Foods plc.	Major Diversified Food
4	Ted Baker plc.	Textile Apparel Clothing
5	British American Tobacco plc.	Tobacco Products
6	*GKN plc.*	Auto Parts
7	SABMiller plc.	Beverages Brewers
8	Henry Boots plc.	Residential Construction
9	BAE Systems plc.	Aerospace Defense
10	Balfour Beatty plc.	General Contractors
11	Bodycote plc.	Diversified Machinery
12	Shanks Group plc.	Waste Management
13	Low & Bonar plc.	General Building Materials
14	Tanfield Group plc.	Machine Tools & Accessories
15	Inmarsat plc.	Wireless Communications
16	Fidessa Group plc.	Business Software & Services
17	PV cystalox plc.	Semi conduct Board Line
18	The Vitec Group plc.	Communication Equipment
19	Wolfson Microelectronics plc.	Equipment Materials
20	Psion plc.	Computer Based Systems
21	Aegis Group plc.	Diversified Communication Services

**The Annual Reports of above companies throughout 2007 to 2011 are downloaded respectively.

5.4 Analysis Method – Content Analysis

Worldwide, regulators view narrative disclosures as the key to achieving the desired step-change in the quality of risk reporting (Beattie, McInnes and Fearnley 2004). Thence, the methodology for analyzing and evaluating narratives in sampled annual reports in this study is *Content Analysis*, which is most popular in company report studies (Elo and Kyngas 2007).

Content analysis of a written document involves coding words, phrases, and sentences against a particular schema of interest (Bowman 1982) to distil words into content related categories. Therefore, considering the high flexibility of content analysis, the study will focus on both *qualitative* and *quantitative* information to codify them into pre-defined categories.

Unit of Analysis

It is assumed by Content analysis that when classified into the same categories, words, phrases and the like share the same meaning (Cavanagh 1997). In measuring the risk reporting practices in firms' annual reports, numbers of words, page proportions and sentences can be used.

For the considerations of long length and a great volume of words in annual reports, the unit of *Sentence* was chosen for use in this study. The measurement is also being adopted in Linsley and Shrives (2005, 2006, 2007 and 2008).

Risk Management Performance Questionnaire

As discussed earlier, an appropriate Risk Management Index (RMI) is fundamental for the study's methodology. The quality of the selected indicators in the designed questionnaire will determine the accuracy of the results. It suggested in that the design of the RMI involved establishing a scale of achievement levels (Davis 2003), or determining the 'distance' between current conditions and an objective threshold or conditions in a referenced country.

On the other hand, the selected indicators must be transparent, robust, representative and easily understood by public policy makers at national, sub-national and urban level (Carren˜ o, Cardona and Barbat 2007).

From previous literature, the paper of Carren˜ o, Cardona and Barbat (2007) has proposed a RMI which brings together a group of indicators that measure the disaster risk management performance regarding in a referenced country

In case of this study, the selected indicators that measure firm's risk management performance involve aspects of (1), the Types of risks that firms manage; (2), the Frequency of the board meeting to review risk exposure; (3), the Risk management approach the firm adopt; (4), and most importantly, the total volume of firm's risk disclosures. Finally, these measurements are designed as questions in RMI questionnaire showed in Appendix C.

Single Coding Methodology

After designing the questionnaire, the next step of study's content analysis is choosing a reliable coder technique. It is more reliable to justify the use of a coding instrument that has been based on previous convincing studies or published pieces of work.

By careful discretion, a *Single coder* performed the content analysis is selected in this study, which is the selected methodologies that based around the models (ICAEW, 1998) created by professional accountancy agents and subsequently applied by Linsley and Shrives (2005, 2006, 2007).

Single coder approach has the advantage of enhancing the consistency of analysis (Guthrie, et al. 2004), which facilitates its popularity in studies of company communication.

Broadly, the coding rules are : (1), A quantified disclosure will be scored to '2'; (2) A qualitative disclosure will be scored to '1'; and (3), No disclosure scores '0'. For example, the annual report that discloses strategic risk disclosures would be evaluated a positive score of '1', and the report that doesn't disclose any strategic risks will be awarded a negative score of '0'.

Risk Categorization

As the developed hypotheses of the study have concerned different kinds of risk disclosures, in order to adequately identify the risks into different classes, the study must determine the decision rules of risks categorization.

The study selects the same decision rules utilized in Linsley and Shrives (2006), which divides the risks into financial risk, operational risk, strategic risk and hazard risk, the risk disclosure codification and decision rules are shown in Figure 5.4 below, along with some typical examples that classifying risk.

Figure 5.4 - Risk Disclosure Codification and Decision Rules

Questionnaire Risk Categorization		Typical Examples	
		Company/Reports	**Sentences**
Financial risk	Market risk; Interest rate; Exchange rate; Currency; Commodity; Liquidity; Credit risks	Mondi Paper plc. Annual report 2011. Pp31.	'Adverse *currency* movements and high degrees of *volatility* may impact on the financial performance and position of the Group'
Operational risk	Customer satisfaction; Product development; Sourcing; Environmental; Product and service failure; Efficiency and performance; Health and safety; Brand name erosion Stock obsolescence and shrinkage risks	SABMiller plc. Annual report 2011. Pp20.	'Consumer tastes and behaviors are constantly evolving……, Failing to ensure the strength and relevance of our brands'
Strategic risk	Environmental scan; Industry; Competitors; Pricing; Regulatory; Business portfolio; Valuation; Planning; Life cycle; Performance measurement; Sovereign and political risks	Premier Food plc. Annual report 2009. Pp38.	'There is strong competition between manufacturers in the grocery business……, We face competition at a category level from these companies on both branded and unbranded products.'
Hazard risk and Other risks	Personal injury or liability; Integrity risk ; Product recall; Property Damage risks; Empowerment risk; Information processing and technology risk;	British American Tobacco plc. Annual report 2010. Pp48.	' Loss of confidential information or malicious manipulation of data, could potentially have a significant adverse impact on the Group's business operations and/or give rise to legal liability'

Decision Rules for Risk Disclosures

To identify risk disclosures a broad definition of risk is to be adopted as explained below:

1. Sentences are to be coded as risk disclosures if the reader is informed of any opportunity or prospect, or of any hazard, danger, harm, threat or exposure, that has already impacted upon the

company or may impact upon the company in the future or of the management of any such opportunity, prospect, hazard, harm, threat or exposure.
2. Although the definition of risk is broad, disclosures must be specifically stated; they cannot be implied.
3. The risk disclosures shall be classified according to the literature chapter, and by reference to the risk categorization above.
4. If a sentence has more than one possible classification, the information will be classified into the category that is most emphasised within the sentence.
5. Tables (quantitative and qualitative) that provide risk information should be interpreted as one line equals one sentence and classified accordingly.
6. Any disclosure that is repeated shall be recorded as a risk disclosure sentence each time it is discussed.
7. If a disclosure is too vague in its reference to risk, then it shall not be recorded as a risk disclosure.

**Based on Linsley and Shrive (2006)

5.5 Empirical Methodologies

After content analysis and its codification method in the annual reports have been codified, it has to further input to statistical tests that adopted for each hypothesis. Based on objectives of the study, different types of methodologies and statistical tests are applied. However, the empirical tests could only being started after the coding of questionnaires is finished.

Mainly, two statistic tests will be utilized in testing hypotheses H2 to H5. Because of non-linearity, a non-parametric test called 'Wilcoxon signed-rank test' will be utilized to test hypotheses H2 and H3 to compare the risk reporting differences between ERM firms and non-ERM firms. The conceptual background of non-parametric test is based on the irreparably non-normality of the data (Berkman and Reise 2012).

Differ from testing hypotheses H2 and H3; a different statistic test of 'Pearson correlation' is used to measure the correlation between firm size and risk reporting performance. Correlation is the degree of the *linear* relationship between two variables (Berkman and Reise 2012). Nonetheless, all selected tests will be run by the same analysis software, SPSS 16.0 for Windows.

'Wilcoxon Signed Ranks Test' Examining Hypotheses H2 and H3: The Effects of ERM on Risk Reporting

Under the sets of hypotheses two and three, differences in risk reporting performances between ERM firms and non-ERM firms will be tested. Similar to previous studies in Linsley and Shrives (2005, 2006, and 2007), a non-parametric test called 'Wilcoxon signed ranks

test' is selected to measure the statistic differences between two groups, because of the non-normality distributed. For the non-parametric test, an assumption of variance is not relevant anymore (Cooper and Schindler 2008).

The basic concept behind the test combines that of the nonparametric tests, which is to assume the data to follow a distribution parameter (e.g., F or t). The differences between two groups are computed by ranking the differences irrespective of sig, and summing the ranks separately for positive and negative signs (Beretta and Bozzolan 2004). In this study, the results computed only for *positive* ranks. And the P values for Wilcoxon test are computed based on the smaller (lower-ranked) sample.

With respect to sample size, Wilson, Voorhis and Morgan (2007) indicated that the optimal number of samples in testing statistic differences between two groups is 30 per cell, which results in approximate 80% of prediction power of the model. In order to enhance the reliability of the findings, the study has adopted an observation size of 105, with at least 35 sampled units in each group.

For example, in test of hypothesis H2 (a) - the total scores of risk management in the reports of ERM firms will be significantly higher than the reports of non-ERM firms throughout 2007 – 2011, the 21 firms are divided into two groups of ERM firms and non-firms. Based on the results of hypotheses H1, the companies that have been stated its enterprise-wide risk management in its five years' annual reports would be classified as ERM firms, while the other firms would be classified as non-ERM firms. In this case, the sample sizes will be separately 70 to 35.

'Pearson Correlation' Examining Hypotheses H4 and H5: The Effect of Company's Size on Risk Reporting

Pearson correlation coefficient will be calculated to test the last two hypotheses sets: the levels of association between the scores of firm's risk management and the independent variable of company size, and the levels of association between the number of risk disclosures and the independent variable of company size. The method is well-received in testing differences between groups, referenced studies including Linsley and Shrives (2005, 2006, and 2007).

Concerning the sample size, different from Wilcoxon signed-rank test, an identical sample size of 105 will be applied in each hypothesis. However, it has to mention that the study has

collected the annual reports from financial years 2007 to 2011, which means that each report has be defined as one sampled data. Such produced limitations of the methodology will be discussed later.

Measurement of Firm Size

Under the considerations that 'Pearson correlation' is the most common test that sensitive only to a linear relationship between two variables or if one is a nonlinear function of the other (Berkman and Reise 2012), the independent variable that selected to measure firm size in this study has to be converted to their *natural logarithm* because of non-linearity (Linsley and Shrives 2006).

5.6 Limitations of Data and Methodologies

Data

The sampling process in the study might cause unavoidable reliability problem in later analysis. The number of sampled annual reports is 105 that gathered from 21 companies throughout 2007 to 2011. Which implies the each firm will contribute five data units in the whole sample, in terms of risk management scores, the total volume of risk disclosures and the measures of firm size. However, even the number of sampled firms is limited, but it won't influence the significance of empirical analysis including 'Wilcoxon signed-ranks' test and 'Pearson coefficient' test.

Reliability and Validity of Methodology

Before implementation, the limitation of adapted methodology shall be noted. The most important weakness of Content Analysis lies in its consistency (or reliability) of the content categorization. Weber (1990) stated that the problem is normally a result of ambiguity of word meanings or category definition.

The three main reliabilities to be achieved in content analysis are: (1), Stability; (2), Reproducibility; and (3), Accuracy (Krippendorff 2004).

To alleviate this, stability can be achieved by the unchanged coding and categorization during analysis process. As suggested in Weber (1990), the study can enhance the stability of the content analysis by double codifying the same content using the same coder.

Second, the reproducibility concerns whether a different investigation could obtain the same results. The problem could be achieved by utilizing 'Inter-rater reliability', i.e. assigning

more than one coder to codify the content. However, in the case of this study, it won't apply the procedure of adding extra coder due to the time consuming, previous or future studies that address on this area of topic could further verify the findings.

Besides reliability, validity is a critical issue in using content analysis. It concerns about the represent implicit concepts in category or variable corresponds, i.e. the degree to which a variable is measuring what it is intended to determine (Holsti 1969).

The enhanced validity can be achieved by careful designing of categories. Applied in this study, the risk categorization and decision rules are designed closely referred to previous studies in this area, the coding process will also repeated checked in order to improve the better version of risk categorization.

Finally, Linsley 2006 stated that the reliability of a simple binary coding scheme can be improved by producing decision (disambiguation) rules that the coder can refer to. Also, (Milne and Adler 1999) have suggested a 'Learning cycle' of coder to further maximize the effectiveness of content analysis.

Under this consideration, the coder and author (in this study the coder is the same person as author) will code an initial sample of 5 annual reports respectively selected from 5 different companies as preliminary. The results of this testing were used to create the decision rules and to improve the questionnaire.

CHAPTER 6

Results and Analysis

CHAPTER 6 - Results and Analysis

6.1 Overall Practice

The analysis is processed based on the study's research methodology. A total of 105 annual reports were read and coded. This chapter mainly contains the study's results, along with regarding basic analysis. The discussion and explainable reasons with respect to the finding are presented in last chapter 7.

Regarding Hypotheses set 1 – Adoption Level of ERM and Organizational Structure

There are 14 out of 21 companies that have claimed their implementations of Enterprise-wide risk management in their annual reports throughout 2007 to 2011, with 5 companies have already established comprehensive ERM organizational structures by appointing CROs or risk committees.

Because of the inconsistency between the number of firms that claiming the adoption of ERM and the number of firms that timely appointing CROs or risk committees, it has to determine which of the number that the following studies use as the unique number of ERM firms.

It suggested that firms might not identically disclose the information about appointing CROs or establishing risk committees in their annual reports. And they might separate the responsibilities of implementing ERM into other committees' duties instead of appointing CROs or establishing risk committees (Saeidi, et al. 2012), but these are also considered as feasible ways to implement an integrated risk management approach (Nocco & Stulz 2006).

Thus, the following empirical studies would use the number of firms that claiming the adoption of ERM as the number of ERM firms.

Questionnaire Practices

As discussed in previous chapter, in order to enhance the reliability and validity of the methodology, the study has coded the designed questionnaire by coding the initial five annual reports as a preliminary process. And finally gets the utilized questionnaire shown in Appendix C.

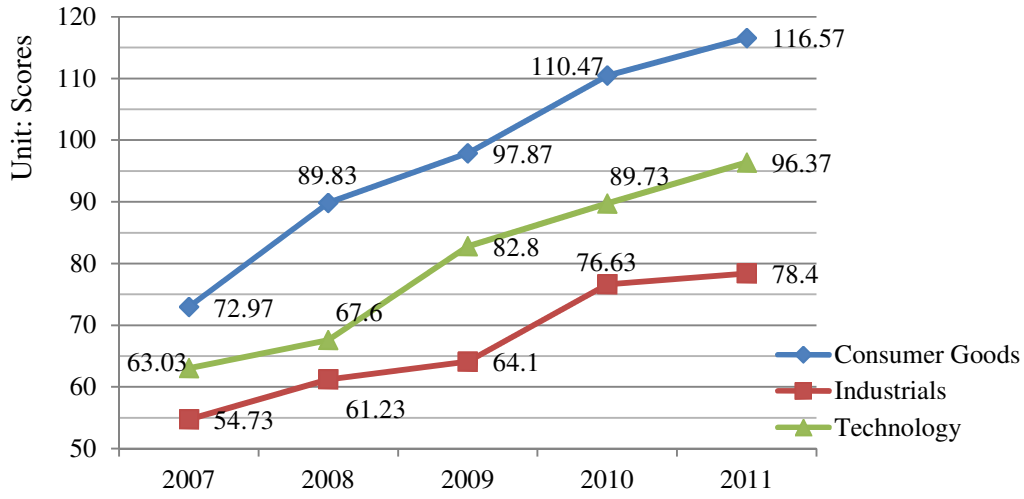
According to the coding rules, the coder (i.e. the author) has read the 105 annual reports respectively and identified the risk management sentences in each report. Finally, the scores regarding firm's risk management performance in each year have been evaluated and recorded in Appendix D.

Risk Management Performance Scores

The 21 companies are from 21 different sectors within three non-financial industries. After coding and evaluating all the annual reports of sampled companies, the study finds that the scores regarding overall risk management performances vary in industries.

The average scores of the three industries throughout 2007 to 2011 are respectively: 110.15 (Consumer goods), 79.9 (Industrials), and 67.02 (Technology). Figure 6.1a below has shown the overall practices of scores evaluations within the three industries:

Figure 6.1a - Average overall risk management performance scores in three industries throughout 2007 to 2011.



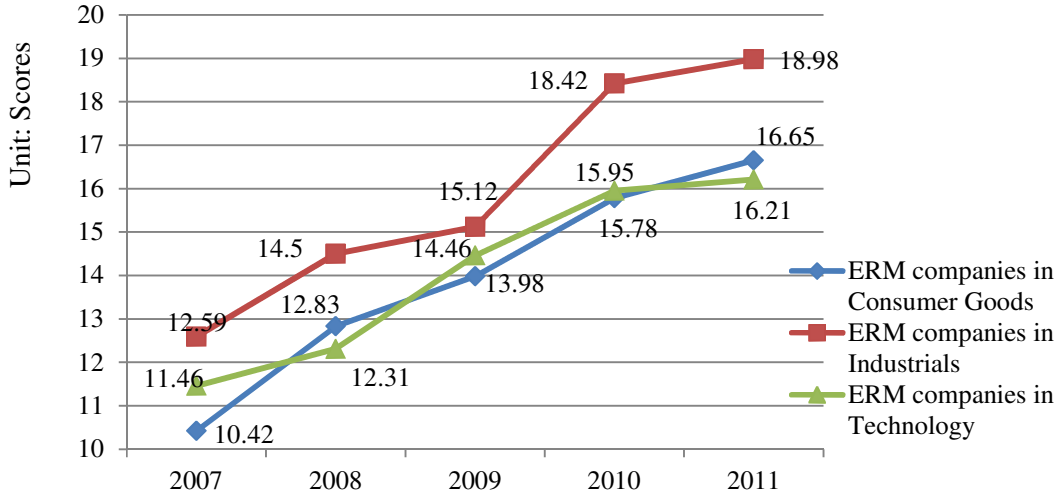
*Particular scores given are listed in Appendixes D.

The average overall risk management scores in three industries are drawn as marked lines in Figure 6.1a. Obviously, for all the three industries, as year increases, the lines rise gradually, and show increasing risk management scores throughout the five years.

Particularly, Consumer goods is always evaluated the highest scores throughout year 2007 to 2011, from the average score of 63.03 in 2007 goes up to the highest mark of 116.57 in 2011. The industry with the medium rank of average risk management performance scores is Technology. However, it deserves to be mentioned that the average score in Technology is evaluated as 67.6 in year 2008, but it jumps up to 82.8 in 2009 with an increased scope of approximate 15 scores. It means that most of the companies in Industrials have performance well during the year 2008. The better performances might reflects in aspects of increased

volume of risk disclosures, better risk reporting practices, and most possibly, an adoption of ERM approach.

Figure 6.1b - Average overall risk management performance in ERM companies throughout 2007 to 2011.



*Particular scores given are listed in Appendixes D.

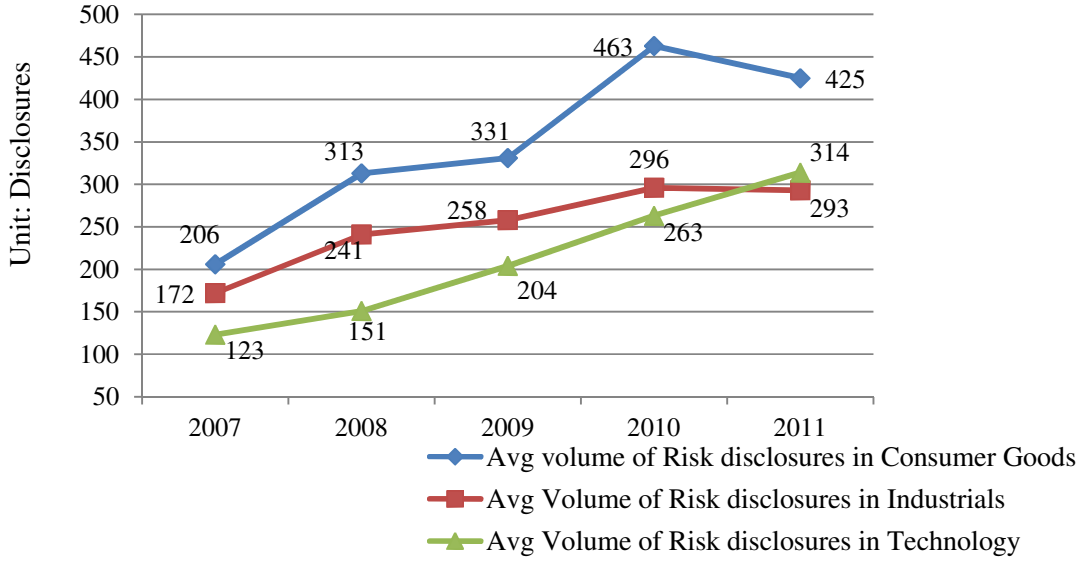
To oversee the risk management performance scores in ERM adopted companies, above Figure 6.1b is drawn. As a whole, the scores of ERM companies in the three industries have been evaluated higher in year 2010 and 2011 compared to year 2007 to 2009. Possible reasons of this jump could be the increased number of established risk committees or appointed CROs within the firms. Indeed, the study finds out that there are three ERM adopted companies have consequently established risk committees around year 2010, which highly increase the average scores of the whole sample.

The Volume of Risk Disclosures

A total of 4053 risk disclosure sentences were identified within the sample of annual reports. The risk categorizations and sentence characteristics that these disclosures fall within are detailed in last chapter.

The total volumes of risk disclosures have shown in Figure 6.1c, and the volumes of Risk disclosures in ERM companies have shown in Figure 6.1d.

Figure 6.1c - Average volume of Risk disclosures in three industries through 2007 to 2011



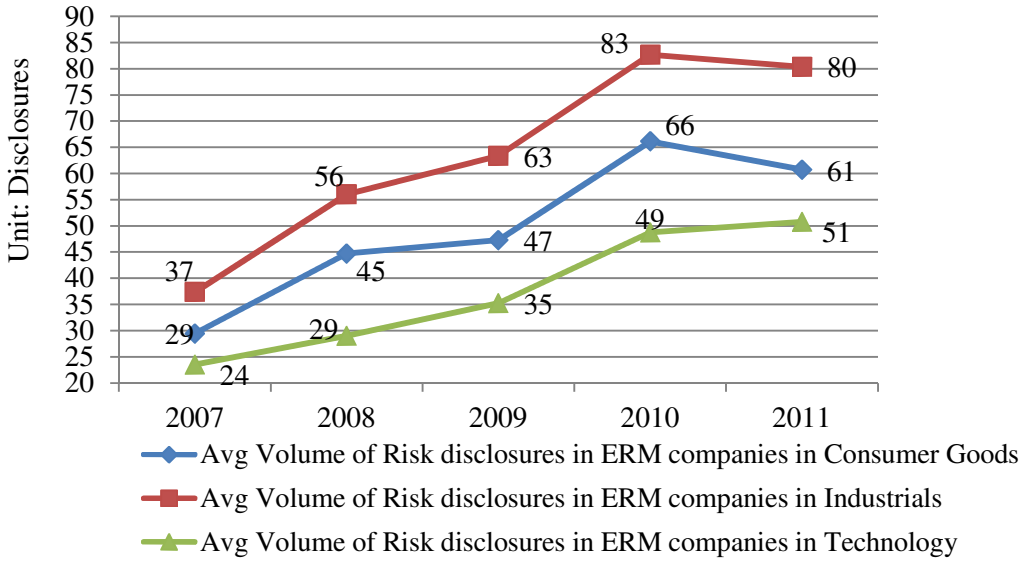
From Figure 6.1c. The numbers of risk disclosures exposed in Consumer goods companies' annual reports throughout 2007 to 2011 are always greater than the numbers in other industries' companies respectively.

In detail, for companies in Consumer goods, the average volume of disclosed risk reaches its peak of 463 disclosures in year 2010, and next falls down to 425 disclosures in year 2011. The other two lines grow a little gentler compared to the blue one. It means that among the companies both in Industrials and Technology, the average volumes of risk disclosures have raised by degree of no more than 50 disclosures each year. Without doubt, the differences between these volumes are not significant in years 2007, 2008 and 2011 respectively.

Figure 6.1d below has shown the average volume of risk disclosures in ERM companies within the three industries. Overall, among the ERM firms, the numbers of disclosed risks have grown gradually from year 2007 to 2011, with some fluctuations.

In detail, for Consumer goods, the volume of risk disclosures is growing with a rate of approximate 10 disclosures each year before the year of 2010. The figure reaches up to 83 disclosures in 2010, but then falls to 80 disclosures in 2011. As for industries of Industrials and Technology, the lines grow up quickly with many fluctuations. Generally speaking, the tendencies of these three lines are so similar to each other. They all present peaks in year 2010 and fall down in 2011.

Figure 6.1d - Average volume of Risk disclosures in ERM companies through 2007 to 2011



Measures of Firm Size

Companies' firm sizes are measured by firms' market values (i.e. market capitalizations) over the five years. And the variable has been converted to its natural logarithm because of non-linearity.

Specific figures are shown in Appendix B. The natural logarithm of average market values is 15.32, with a resultant standard deviation of 16.2.

6.2 Hypotheses Testing

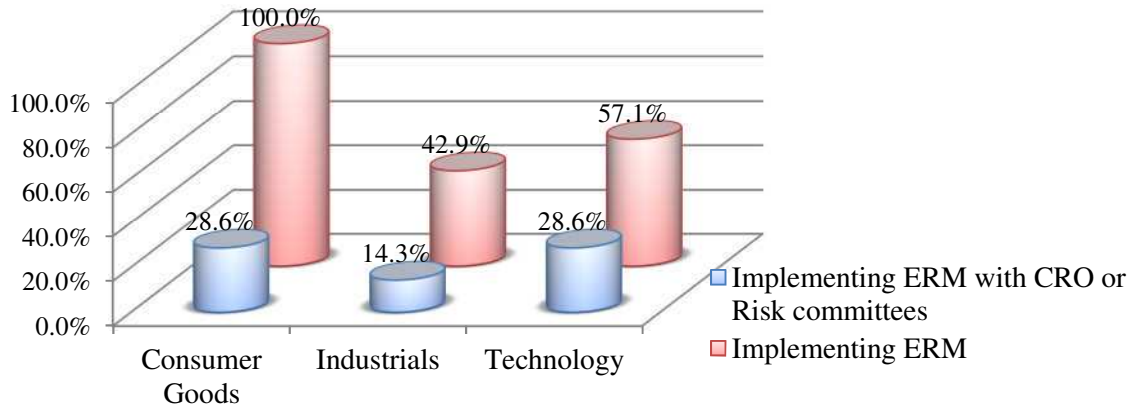
Hypotheses 1: ERM Adoption and ERM Organizational Structure

To test the first hypothesis, the study identifies the sampled reports to find out whether a company has an appointed CRO or risk committee throughout year 2007 to 2011.

Overall, the results are under expectations that 66.7% of the companies have adopted an enterprise-wide risk management and 5 of them (23.8%) have established risk committees. More details are shown in Appendix A.

Figure 6.2a shows the differences in ERM adoption in three industries, and Figure 6.2b shows the regarding organizational structures within these firms.

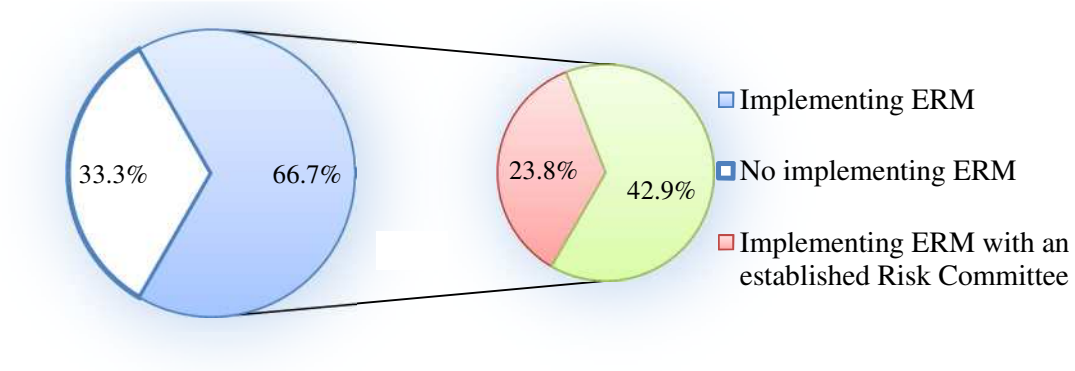
Figure 6.2a - Industry differences in ERM adoption



From Figure 6.2a, the industry with the highest level of ERM adoption is Consumer goods. All of the companies have highly recognized the importance of enterprise-wide risk management that links to the business strategies and opportunities.

Specially, companies of Britvic plc and Ted Baker plc have successfully established risk committees before year 2009 to support and monitor the ERM implementations. Other firms including Premier foods plc, BA tobacco plc and SAM miller plc have sent the duty into other committees' job, such as audit committees and executive committees. Compared to industries of industrials and technology, only 3 out of 14 companies have established efficient ERM organizational structure with a risk committee.

Figure – 6.2b - ERM Adoption & ERM Organizational Structure



In order to clearly descript the inconsistency between the number of firms that claiming the adoption of ERM and the number of firms that timely appointing CROs or risk committees , the pies are drawn as above Figure 6.2b.

Interestingly, among all the sampled firms, even more than a half of the companies have stated that they have implemented ERM approach, but none of them has appointed CRO purposely in charge of ERM implementations throughout the 5 years. Instead, they are more likely to establish a risk committee or to separate the responsibility into CFO's or other committees' duty. Where the bigger pie pictures the overall ERM practices in all companies; and the smaller pie shows the organizational structures practices in these ERM adopted companies. The figures show that 42.9% of ERM adopted firms have neither appointed a CRO nor established a risk committee.

Therefore, the first set of hypotheses H1 could be answered:

***Result H1 (a)**: The number of firms that reporting the implementation of Enterprise-wide Risk Management **is being** increased throughout the year 2007 to 2011.*

***Result H1 (b)**: The number of appointed CRO or Risk Committees in firms **is not** same as the number of firms that reporting the implementation of Enterprise-wide Risk Management.*

Nevertheless, it might not be safe to conclude that the 9 companies with no CRO or risk committee are not deserved the appraisal of 'having an adequate ERM organizational structure'. Like shown in Appendix A, instead of hiring CROs or setting risk comittees pecially, including the tasks in CFO or CEO duties, or separating the responsibilities in other committees' duties, are also considered as feasible ways to implement an integrated risk management approach (Saeidi, et al. 2012; and Nocco & Stulz 2006).

Exactly as literatures propose, many barriers might bar the way of adopting ERM and such difficulties during implementations could influence the achievement of positive results. Reasons could be: (1), Considerations of high costs and time consuming: Baxter (2005) has indicated that hiring a CRO is truly costly for companies. The action not only means an extra high salary expenses, but also requires plenty of time to recruit external consult; (2), Limitations of ERM in corporate objectives: because enterprise risks can only be effectively measured in terms of an enterprise's corporate objectives; (3), Some companies might adopt minimal methods to implement ERM for the considerations of avoiding large changes in organizations, result in barriers to progress and limited resources.

Additionally, it is also not safe to say the 33.3% companies with labels of 'No implementing ERM' are truly not implemented ERM or integrated risk management system. The reliability

of the results depends on the companies' reporting behaviours that whether willing to disclose their principle risks and risk management approaches in their annual reports or other public documents.

However, the principal rational of evaluating firms that having CROs or risk committees with a higher risk management performance score is convincing. Because it signifies a better risk management system for the firms with a CRO or risk committee (Nocco and Stulz 2006), and further implies sound corporate governance and more effective internal control systems (Dickinson, 2001). Once again, the following hypotheses testing will be use the number of firms that claiming implementations of ERM as the number of ERM adoption firms.

Hypotheses 2 and 3: The Effects of ERM on Risk Reporting

Because of non-normality, the non-parametric test of 'Wilcoxon signed-rank test' has utilized to test the statistic difference in risk reporting between ERM firms and non-ERM firms. By assisted by SPSS 16.0, Figures 6.2c to 6.2e are made based on the outputs tables shown in Appendix E. In each figure, the counts, means, sums of the ranks for positive and negative signs, Wilcoxon signed-rank test index (i.e. 'Z' namely in each table) and its two-tailed *p* value are displayed. As a whole, the results are under expectations that with positive answers.

Figure 6.2c – 'Wilcoxon Signed-rank Test' output for testing Hypothesis **H2 (a)**

Test Results / **Variable**		N	Mean Rank	Sum of Ranks
Risk Management Performance Scores	Negative ranks	37[a]	21.86	809.00
	Positive ranks	3[b]	3.67	11.00
	Ties	0[c]	-	
	Total	40		

Test Statistics	Z	Asymp. Sig. (2-tailed)
	-5.363*	.000**

* Based on positive ranks. **P value for one-tailed hypothesis = .000

a. Risk Management Performance Scores in Non-ERM Firms < Risk Management Performance Scores In ERM Firms

b. Risk Management Performance Scores in Non-ERM Firms > Risk Management Performance Scores In ERM Firms

c. Risk Management Performance Scores in Non-ERM Firms = Risk Management Performance Scores In ERM Firms

SPSS output tables are listed in Appendix E.

Figure 6.2c has shown the findings in testing the statistic differences in risk management scores between ERM firms and non-ERM firms by using Wilcoxon signed-rank test.

From the figure, the number of negative ranks is 37 and the number of positive ranks is 3, with zero ties. The figures indicate that there are 37 annual reports in ERM firms have been evaluated greater scores compared by the scores in annual reports of non-ERM firms. While 3 annual reports in non-ERM firms have been evaluated greater scores than the scores in annual reports in ERM firms. The sum of negative ranks is 809, and the sum of positive ranks is 11, which has shown a significant difference between the two groups.

Based on positive ranks, a negative value of -5.363 verified that the scores in ERM firms' reports are averagely higher than the scores in non-ERM firms' reports. The significant value of .000 implies support, at the 5% level, for the risk management scores in the reports of ERM firms being significantly greater than the scores in the reports of non-ERM firms.

Therefore, the hypothesis is tested as ***Result H2 (a):*** *The average scores of risk management in the reports of ERM firms* ***being significantly*** *higher than the reports of non-ERM firms throughout 2007 – 2011;*

Figure 6.2d - 'Wilcoxon Signed-rank Test' output for testing Hypothesis **H2 (b)**

Test Results / **Variable**		N	Mean Rank	Sum of Ranks
Volume of Risk Disclosures	Negative ranks	30[a]	19.18	575.50
	Positive ranks	6[b]	15.08	90.50
	Ties	4[c]	-	
	Total	40		

Test Statistics	Z	Asymp. Sig. (2-tailed)
	-3.810*	.000**

* Based on positive ranks. **P value for one-tailed hypothesis = .000
a. Total Volume of Risk Disclosures in Non ERM Firms < Total Volume of Risk Disclosures in ERM Firms
b. Total Volume of Risk Disclosures in Non ERM Firms > Total Volume of Risk Disclosures in ERM Firms
c. Total Volume of Risk Disclosures in Non ERM Firms = Total Volume of Risk Disclosures in ERM Firms
SPSS output tables are listed in Appendix E.

Figure 6.2d is made to oversee the Wilcoxon signed-rank test results regarding hypothesis H2 (b): the total number of risk disclosures in the reports of ERM firms will be significantly higher than the reports of non-ERM firms throughout 2007 – 2011.

In testing hypothesis, the number of negative ranks is 30, and the number of positive ranks is 6, with 4 tied. It means that there are 30 annual reports in ERM firms exhibiting a greater number of risk disclosures, and 6 annual reports in non-ERM firms exhibiting a greater number of risk disclosures. And 4 out of 40 annual reports have exhibited a same number of risk disclosures. The sum negative rank is much bigger than the sum of positive ranks.

Based on positive ranks, the negative figure of -3.810 supports the conclusion of significant higher volume of risk disclosures in ERM firms' reports than volume of risk disclosures in non-ERM firms' reports. The two tailed *p* value is still .000 at the level of 5%.

Thus, the test of hypothesis is completed as ***Result H2 (b):*** *The total number of risk disclosures in the reports of ERM firms* ***being significantly*** *higher than the number of risk disclosures in reports of non-ERM firms throughout 2007 – 2011.*

To sum up the hypotheses H2 (a) and H2 (b), firms implementing an enterprise-wide risk management are more likely to disclose their risks in annual reports, and further to perform more effective and comprehensive risk management in practices. This result is corresponded with the findings of previous researches. The risk managers adopted ERM are constantly seeking for more integrated risk management products and solutions (Saeidi, et al. 2012). Thus, companies with efficient risk management approach and independent risk managing apartment leading by CRO or risk committee are more likely to perform better risk management practices compared to others.

The higher scores and higher number of risk disclosures might be achieved by: (1), Increasing the volume of risks that the firm is realized to identify and manage; (2), Establishing the consolidated and integrated risk reporting process within the organization; (3), Increasing the frequency of the board meeting to review risk exposure during a year. No matter which of the above the company takes, according to the study's designed questionnaire, it would reward the company with corresponding scores.

For example, Aegis Group plc in Technology industry has an average score of 19.1 in overall risk management performance throughout the five financial years. According to the records

in Appendix D, Aegis has implemented ERM during year 2007 to 2011 with a successful established risk committee. Like states in Aegis's 2011 annual report: "The *board* is ultimately responsible for risk management and determining the natural and extent of the risks it is willing to take in achieving its *strategic objectives*……, it delegates risk management to its *risk committees*, which report into the *group audit committee*". Therefore, according to study's scoring methodology, the firm is truly deserved a positive mark of '1' point that recorded in questionnaire sheet, which indicates 'a comprehensive organization structure regards to ERM framework' is applied within the organization. Additionally, it can also find that a high score of '6' is given in year 2011, 2010 and 2009 to Aegis regarding question ten, which measures the frequency of the board risk meeting during a year. A score of '6' signifies that Aegis Group plc holds the board meeting monthly to review firm's risk exposure. It significantly enhances the average scores of the whole Technology industry.

Figure 6.2e - 'Wilcoxon Signed-rank Test' output for testing Hypothesis **H3 (a)**

Test Results / **Variable**		N	Mean Rank	Sum of Ranks
Volume of Financial Risk Disclosures	Negative ranks	29[a]	19.07	553.00
	Positive ranks	8[b]	18.75	150.00
	Ties	3[c]	-	
	Total	40		
Test Statistics	Z		Asymp. Sig. (2-tailed)	
	-3.041*		.000**	

* Based on positive ranks. **P value for one-tailed hypothesis = .001
a. Total Volume of Financial Risk Disclosures in Non ERM Firms < Total Volume of Financial Risk Disclosures in ERM Firms
b. Total Volume of Financial Risk Disclosures in Non ERM Firms > Total Volume of Financial Risk Disclosures in ERM Firms
c. Total Volume of Financial Risk Disclosures in Non ERM Firms = Total Volume of Financial Risk Disclosures in ERM Firms
SPSS output tables are listed in Appendix E.

The Wilcoxon test is also utilized to exam the hypotheses set of H3, to find out the differences in reporting financial and non-financial risks between ERM firms and non-ERM firms. As concluded previously in methodology, such non-financial risks are including operational risk, strategy risk, hazard and other risks. This risk categorization is based on the paper of Linsley and Shrive (2006), which is addressed to study the firms' risk reporting

practices. Additionally, the rational of this risk categorization is also reflected in the designed questionnaire, particular in question 12, to measure the volumes of different level of risk disclosures reported in firm's annual reports throughout year 2007 to 2011.

The hypothesis H3 (a) is for testing the statistic difference in the number of financial risk disclosures between ERM firms and non-ERM firms. As shown in Figure 6.2e, the negative ranks is 29, which means that there are 29 annual reports in ERM firms exhibiting a greater volume of financial risk disclosures. The positive ranks is 8, which implies that there are 8 reports in non-ERM firms have exhibited a higher number of financial risk disclosures than the reports in ERM firms. The tied ranks is small, only 3 annual reports in both ERM firms and non-ERM have disclosed the same volume of financial risk disclosures. But, in the case of Figure 6.2e, the difference between the sum of negative ranks and the sum of is not as great as previous.

Based on positive ranks, the Wilcoxon index is -3.041, with a *p* value of .002 at a two-tailed significant level of 5%. So it could conclude that the number of financial risk disclosures in ERM firms' annual reports is being significantly greater than the number of financial risk disclosures in non-ERM firms' annual reports.

Therefore, the hypothesis can be answered: ***Results H3 (a):*** *The total number of 'financial' risk disclosures in ERM firms* ***is being*** *significantly higher than in non-ERM firms throughout year 2007-2011;*

Figure 6.2f - 'Wilcoxon Signed-rank Test' output for testing Hypothesis **H3 (b)**

Test Results / **Variable**		N	Mean Rank	Sum of Ranks
Volume of Non-Financial Risk Disclosures	Negative ranks	30[a]	19.18	575.50
	Positive ranks	6[b]	15.08	90.50
	Ties	4[c]	-	
	Total	40		
Test Statistics	Z		Asymp. Sig. (2-tailed)	
	-3.810*		.000**	

* Based on positive ranks. **P value for one-tailed hypothesis = .001
a. Total Volume of Non-Financial Risk Disclosures in Non ERM Firms < Total Volume of Non-Financial Risk Disclosures in ERM Firms

b. Total Volume of Non-Financial Risk Disclosures in Non ERM Firms > Total Volume of Non-Financial Risk Disclosures in ERM Firms
c. Total Volume of Non-Financial Risk Disclosures in Non ERM Firms = Total Volume of Non-Financial Risk Disclosures in ERM Firms
SPSS output tables are listed in Appendix E.

Same as previous, the results in Wilcoxon test have shown in Figure 6.2f. But in this case, it is testing the number of non-financial risk disclosures reported in year 2007 to 2011, which including the operational, strategy, hazard and other risk disclosures.

As expected, the number of negative ranks (30) is much higher than the number of positive ranks (6). The tied ranks are 4. The results indicate the number of non-financial risk disclosures in ERM firms' reports is much greater than the number in non-ERM firms. Wilcoxon test has examined the statistic significant of the result, based on positive ranks. It has shown a negative value of -3.810. The significant *p* value of .000 implies support, at the 5% level, for the number of non-financial risk disclosures in reports of ERM firms is significantly higher than the non-ERM firms.

Finally, ***Result H3 (b):*** *The total number of 'non-financial' risk disclosures in reports of ERM firms* ***is being*** *significantly higher than in non-ERM firms throughout 2007-2011.*

By summing up hypotheses H3 (a) and (b), the total numbers of 'financial' and 'non-financial' risks in ERM firms are significantly greater than in non-ERM firms. In other words, the firms of which claiming such implementations of Enterprise-wide risk management are more likely to disclose different levels of risks to public, and more likely to provide greater scopes of risk information to outside stakeholders.

Explainable reasons could be found in previous literatures. Various studies have identical shown that ERM implementation affects organizational performance extensively (e.g. Lai and Samad 2010, Hoyt and Liebenberg 2010), which reflect in aspects including improved risk assessment framework that aligned with other corporate activities (AIRMIC 2010). Therefore, companies with efficient risk managements such as an integrated and consolidated risk management approach are more able to accurately identify the firm's risk appetite and tolerances in respect of all types of risk. The importance of producing a risk appetite reflects in determining enterprise's strategic risk decisions, tactical decisions and routine activities (AIRMIC 2010). Effective risk assessment and risk appetite setting processes that leading by an enterprise-wide risk management framework would result in better risk reporting practices within the firms.

On the other hand, an integrated and holistic risk reporting process requires a better understanding of risk management by different levels of stuff; therefore a better company-wide resource allocation would be achieved (Harrington and Niehaus 2003). It determines the firms implementing ERM approach to better understand the risk and risk management than before, and more able to expose potential risks faced by the firms. Therefore, it explains the greater volume of risk disclosures within these ERM firms.

Hypotheses 4 and 5: The Effects of Company's Size on Risk Reporting

Hypotheses 4 and 5 are dressed to measure the statistic correlation between firm size and firm's risk reporting. Figure 6.2g below concludes the overall given scores in three industries, which shows the average score among 105 annual reports, the standard deviations , and the measure of firm size.

Figure 6.2g - Descriptive statistics

Risk Reporting Variables	**N**	**Min.**	**Max.**	**Mean**	**Std. Deviation**
1, Risk Management Performance Scores	105	1.13	27.73	11.64	5.8395
2, Total Volume of Risk Disclosures	105	0	169	38.61	35.6259
3, Financial Risk Disclosures	105	0	55	9.99	12.1588
4, Non-Financial Risk Disclosures	105	0	144	28.72	28.8059
Valid	105				
Firm Size Variable		**Min.**	**Max.**	**Mean**	**Std. Deviation**
Natural log of Market cap.	105	9.798	17.913	13.441	1.8727

SPSS output tables are listed in Appendix F.

From Figure 5.2g, the minimum score among the 105 sampled reports is 1.13, and the maximum score is 27.73, with an average score of 11.64. The risk management performance scores for the three industries have a large standard deviation of 5.8395, which implies the significant differences in risk management performance between the sampled companies.

As for the volumes of total risk disclosures, financial risk disclosures and non-financial risk disclosures, it indeed varies among annual reports. Obviously, each catalog has the minimum number of zero disclosure. It indicates that at least one report from year 2007 to 2011 has not exhibited any risk disclosure. The standards deviations for the total volume of risk disclosures and non-financial risk disclosures are extremely big. It can say that there is a significant difference in risk reporting practices among the samples. More detailed, the companies made up the minimum disclosures in each industry include Ted Baker plc in Consumer Goods, Henry Boots plc and Tanfield Group plc in Industrials, and The Vitec Group plc in Technology.

Regarding to the measurement of firm size, each firm's market capitalizations throughout year 2007 to 2011 are downloaded and converted to their natural logarithm because of non-linearity.

Figure 6.2h – 'Pearson Correlation co-efficient' for variables for testing Hypotheses H4 to H5

Risk Reporting Variables / **Firm Size Variable**		1, Risk Management Performance Scores	2, Total Volume Of Risk Disclosures	3, Financial Risk Disclosures	4, Non-Financial Risk Disclosures
Natural log of Market cap.	Pearson Correlation	**.604****	**.574****	**.340****	**.559****
	Sig. (2-tailed)	.000	.000	.000	.000
	Covariance	6.606	38.319	7.736	30.172
	N	105	105	105	105

** Correlation is significant at the 0.01 level (2-tailed); P values for one-tailed hypothesis for each pair = .000.

SPSS output tables are listed in Appendix F.

'Pearson Correlation co-efficient' is utilized to test the statistic correlation between the risk reporting variables and firm size variable. The SPSS outputs have been concluded in Figure 6.2h above. Overall, all correlations have shown positive values, at significant level of 1%.

Respectively, the first column has shown the Pearson correlation between the risk management performance scores and firms' Nat log market capitalizations. A positive value

of 0.604 implies the positive correlation between the dependent variable of scores and the independent variable of company size. The significant level of .000 indicates support, at 1% value, for the positive correlation.

Therefore the hypothesis can be tested as ***Result H4 (a):*** *A* ***significant positive*** *relationship between company size and the scores of risk management performance*.

In testing hypothesis H4 (b) – the relationship between company size and the volume of risk disclosures, the figures in second column have also shown positive results. The Pearson correlation is 0.574, with a significant value of .000 at 1% level, implies the strong positive relationship between the independent variable of firm size and the dependent variable of total volume of risk disclosures.

Thus, the second hypothesis in set 4 is answered ***Result H4 (b)****: A* ***significant positive*** *relationship between company size and the volume of risk disclosures.*

Afterwards, the last two columns in Figure 6.2h have shown the tests for hypotheses H5 (a) and (b), respect to the relationship between firm size and total numbers of financial and non-financial disclosures.

The Pearson correlations for the two variables are 0.34 and 0.559 separately. And the significant values are both .000 at 1% level. Thus, it indicates the strong positive relationship between the independent variable of firm size and the dependent variables of the numbers of financial and non-financial risk disclosures.

At last, the fifth set of hypotheses can be completed:

Result H5 (a): *A* ***significant positive*** *relationship between company size and the total number of financial disclosures;*

Result H5 (b): *A* ***significant positive*** *relationship between company size and the total number of non-financial disclosures.*

To summarize the hypotheses of H4 (a) and (b), it can say that bigger companies are more likely to be given higher scores regarding to its risk management performance, and are more likely to disclose high volume of risk information in their annual reports.

Likewise, the summary of the hypotheses H5 (a) and (b) could be: larger firms with greater market capitalizations values are more likely disclose financial and non-financial risk disclosures than smaller firms.

Reasons and explanations can be found in previous literatures. Bigger companies with high level of turnovers and market capitalizations are more likely to implement integrated risk management concepts than smaller firms Beasley and Hermanson (2005). It is because those larger firms are usually along with long-standing history and greater operation scope. The rich experiences enable them to dedicate greater resources for implementing risk management process and to further efficiently control financial distress and manage exposed risks.

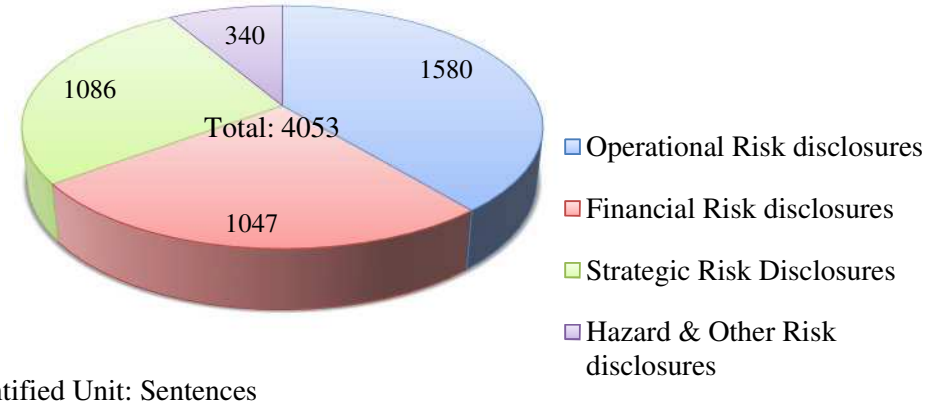
For example, the largest firm in industry Consumer goods – British American Tobacco plc has a business life of more than 100 years. The company 'born international' in 1902, during several decades, the business has developed over a century's expertise in operating locally in diverse cultures around the world. From the results shown in Appendix D, the risk management scores throughout 2007 to 2011 have identical present good performance for BA Tobacco plc. As the biggest company in Consumer goods industry, the company has ranked first among the seven companies with an average score of 23 in the five years. Indeed, the great risk management performance is the result of effective risk managing and consolidated internal audit. "Each risk is considered in the context of the *group strategy* by identifying the principal strategic element to which it relates", the company insist on extensive analysis of all risks affecting the firm and managing them by accurate identification and better resources location.

Additionally, the three companies of BAE Systems plc in Industrials, British American Tobacco plc in Consumer Goods, and Aegis Group plc in Technology have practiced excellent risk disclosures in their five year's annual reports. From Appendixes D, it can easily find out the common of these three firms, is that they are the biggest companies among each industry. By the end of 1st Jan, 2012, the numbers of employees within these large companies are separately 87,000 in BAE Systems plc, 87,813 in British American Tobacco plc, and 12,005 in Aegis Group plc. The large amounts of employees imply the large operational activities of the firms, with more possibilities to expose different types of risks.

Risk Disclosures Proportion Findings

In order to descript the risk disclosures in more details, below Figure 6.2i has shown the general risk disclosures proportion in sampled annual reports. And Figure 6.2j presents the growing trend in risk disclosure during the five years.

Figure 6.2i - Risk Disclosures levels in sampled annual reports



Identified Unit: Sentences

The study finds that among the 105 annual reports, the most popular risk disclosure is operational risk disclosures. And the volumes of financial and strategic risk disclosure are extremely close. The number of hazard and other risk disclosure is 340, which occupies a very small portion among the total volume.

Figure 6.2j – Trends in Risk Disclosures Throughout 2007 to 2011

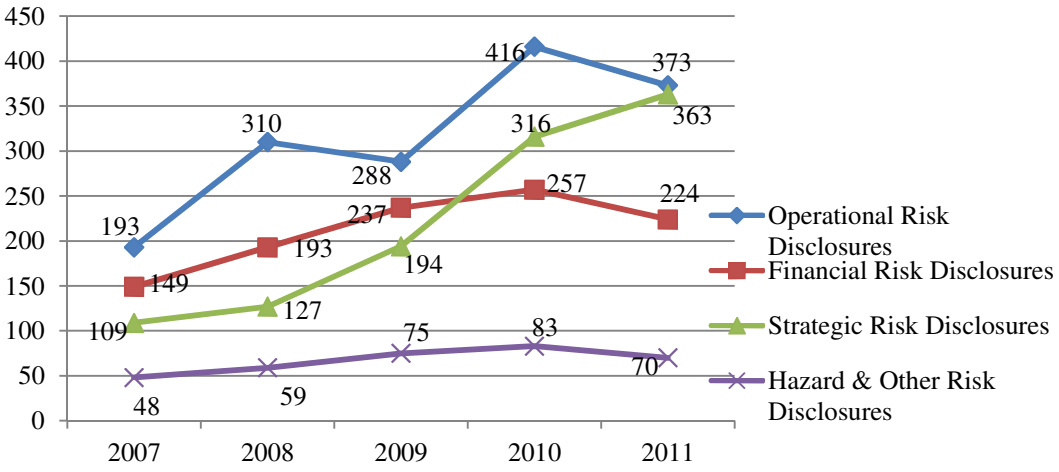


Figure 6.2j shows the growing rates among the four different risk disclosures through the five financial years. Overall, three kinds of risk disclosures have grown obviously, that are operational, financial and strategy risk disclosures. But, such hazard and other types of risks have not shown significant ascent.

These findings imply that firms are becoming to exhibit a growing number of strategy risk disclosures, especially during year 2010 and 2011. The possible reasons for the growing volume of strategy risk disclosures could be the rising level of ERM adoption among firms. More discussions are followed in next chapter.

CHAPTER 7

Discussions and Conclusion

CHAPTER 7 - Discussions and Conclusion

The study was addressed to explore the risk reporting practices in UK public companies, covering the developments in firms' Enterprise-wide Risk Management (ERM) implementations, and the effects of ERM and other firm characteristics on firms' risk reporting practices.

It started with the investigations regarding the current status of ERM adoption, to oversee the risk management developments in the country of study, and further analyse how this approach enhances the overall risk management performance and risk reporting practices in the sampled companies. 105 annual reports of 21 non-financial companies from different industries throughout financial year of 2007 to 2011 made up the study's sample. The selected research method is content analysis, combined with few methodologies regarding different research questions.

The foundation of study's content analysis is a pre-designed questionnaire, to measure the firm's risk management performance and the volumes of various risk disclosures, and finally to convert the qualitative information from annual reports into quantitative data. Empirical methodologies testing the hypotheses are 'Wilcoxon signed-rank' test and 'Pearson correlation co-efficient' test. Overall, the results are under expectations and mostly explainable.

7.1 Discussion of Results

From the literature reviews, many countries have highly recognized the benefits of implementing ERM. Studies of Gates (2006) and Paape and Speklé (2012) have explored the adoption status of ERM in cross countries including UK, have shown the significant increase in ERM implementations during the recent decades. Indeed, the study has shown the identical results.

Form the results, more than a half of the companies have highly recognized the importance of implementing an integrated risk management that closely links to group's strategy setting and business plans. In order to efficiently establish an consolidated risk reporting system within the firm, mechanisms of CROs and risk committees are consequently set up. However, the study has found that it is not every company with an enterprise-wide risk management has

timely appointed a CRO or established a risk committee to specially charge the implementations of ERM.

As analysed in Baxter (2005) and Rasid (2012), the explanable reasons could be the considerations of costs saving and time consuming. In the case of this study, the sampled firms are all randomly selected according to different firm size and consumer scope, but with the common nature of non-financial. It is suggested that financial institutions are exposed much wider ranges of risks than non-financial firms (Linsley and Shrives 2006). Therefore, these non-financial companies are less emphasizing on improving risk management approaches than the financial firms. Due to the high cost and excessive time to hire a CRO or to establish a risk committee specially, they are more prefer to separate the duties into incumbent CFO or CEO's responsibilities. However, by compare, larger firms with higher turnovers and profits are more likely to establish a risk committee than smaller firms.

Besides, the empirical studies to examine the effects of implementing ERM on firms' risk reporting have carried on by utilizing the statistics tests of 'Wilcoxon signed-rank'. The referenced variables to measure the risk reporting practice are the risk management performance scores given according to the questionnaire, the total volume of risk disclosures, the number of financial risk disclosures, and finally the number of non-financial risk disclosures.

The four hypotheses are tested and all answered significantly positively. The companies that indicate an implementation of ERM within their annual reports are more likely to be evaluated with higher scores regarding to overall risk management performance, and are more likely to disclose greater volumes of risk disclosures. The enhanced risk management performances are mainly reflected in aspects of increasing frequency of board risk meeting during a year, the more types of risk disclosures being reported, and most importantly, the implementation of such integrated and consolidated risk management appraches. On the other hand, firms with risk committees or comprehensive enterprise-wide risk management approach are more likely to disclose financial risk disclosures as well as non-financial risk disclosures than other firms. Overall, the significant positive results have strongly approved the great effects of ERM on firms' risk reporting practices.

The discussion of these findings could focus on the inevitable changes on firm's organizational structure due to the adoption of ERM. As discussed in the review, enterprise-

wide risk management is a top-down approach (Pagach and Warr 2010), which requires firms to adjust their organizational structures and to revise their risk categorizations in identification process. Thus, this complext and important process requires the firms frequently holding risk meetings, identifying more kinds of risks, and ultimately, establishing such mechanisms to charge the ERM implementations if neccesary. All of the above actions that being reported in their annual reports are implied the efficient improvements in firm's risk management that ERM brings.

The last two sets of hypotheses are aim to test the stastic correlation between firm size and firm's risk reporting practices. Variables regarding firm's risk reporting practices including the risk management scores evaluated by the study's questionnaire methodology, the total volume of disclosed risk, the numbers of financial and non-financial risk disclosures. The independent variable is the natural logarithm of firm's market capitalizations, which has been selected as the measure of company size. The 'Pearson correlation co-efficient' test is utilized and has shown identical positive results regarding the hypotheses H4 and H5.

From empirical studies, potential relationships between the firm's risk reporting practices and firm size variable were implied. Firstly, the study finds the significant positive effects of firm size on the overall risk management performance, as well as the total number of disclosed risks. Secondly, such highly significant results of 'Pearson test' implied that relationship between company's size and level of overall risk disclosures may exist in a positive way. This positive correlation reflects in both financial and non-financial risk disclosures in particular.

At last, from Figure 6.2i and 6.2j, the study also finds that the most popular risk disclosure in UK non-financial companies is operational risk disclosures. And firms are becoming to exhibit growing numbers of strategy risk disclosures, especially during year 2010 and 2011. The possible reasons for the growing volumes of strategy risk disclosures could be the rising level of ERM adoption among firms. As tested in hypotheses set 1, the adoption level of Enterprise-wide risk management in sampled firms is increased recently, and the approach is specially emphasized on strategy risk management, which different from other approaches.

This findings are consistent with the results in Linsley and Shrives (2006) and Beretta and Bozzolan (2004), which have investigated the risk reporting behaviors in UK and Italian firms accordingly. In a word, the results from the last two hypotheses testing imply that risk

reporting practices are made logically according to firm size, and the risk reporting practices among UK non-financial listed companies are more emphasized on operational and strategy risk disclosures.

Limitations of the study

Before conclusion and recommendations, some limitations of the study should be noted by the readers. First of all, the sampling process of data might cause unavoidable reliability problems in content analysis. Due to the limited time and resources, the scope of the study is confined within the country of the study, the non-financial nature of the companies, as well as the referenced years tha selected by the study.

Future studies related to the same topics could be made in different scope and time serious. For example, possible reliability improvement could be obtained by adding financial companies in the study's sample. Flannery (2000) had suggested that it may be more practical to focus on the context of financial reporting as holistic approach of risk discussions could be problematic.

Secondly, the applied content analysis in this study is combined with complex and different methodologies (e.g. questionnaire designing), which might inevitably cause personal judgment regarding each designed analysis process (Carney 1972). The most important weakness of Content Analysis lies in its consistency (or reliability) of the content categorization.

For example, the coding process of determining whether a sentence is risk disclosure or not, and classifying which category the risk disclosure belong to. But, it does prove by the previous reseachers that the content analysis is an effective method for study annual reports (Weber 1990). To alleviate this, the study has utilized the clear definitions and categarization rules of risk disclosures, which are identically provided by the prior researches. More particularly, the risk classification and decision rules adopted by the study are identical as the study of Linsley and Shrives (2006).

7.2 Conclusion and Recommendations

After disclussing and explaining the entire empirical evidences, the research questions of this study could be answered as: (1), The adoption level of ERM in UK listed firms has increased recently, but not associated with the related ERM organizational structure. The study finds that it is not every company with an enterprise-wide risk management has timely appointed a CRO or established a risk committee to specially charge the implementations of ERM. (2), The effects of ERM on firm's risk management and risk reporting practices are significant. Particularly reflects in the enhanced risk management performance and improved risk reporting behaviours for the implemented firms; (3), and finally, such firm's characteristics such as firm size, has significant impacted on firm's risk management performance and risk reporting practices. It implies that larger firms have performed better risk management performance and risk reporting practices.

Besides the research questions, several issues with respect to Enterprise-wide risk management and risk reporting practices of the sampled UK non-financial companies chould be highlighted by the study.

Firstly, the study examines two main themes relating to ERM. One is the adoption level of ERM throughout the recent five years, the firms of which exhibiting the risk information of implementing ERM are implied as the ERM adopted firms. And one is the implementation level of ERM system within these ERM adopted firms, which using the appointed CROs or risk committee as the signals of mature ERM system. By compare and contrast, the findings largely corroborate the results of prior work, suggesting that the appointed CROs or risk committees are not associated with the implementation of ERM system within the firms. In other words, some firms that chaiming the adoption of ERM have not efficiently established the related mature ERM system.

Like suggested by prior studies, use of CRO or risk committees in a company is a signal of establishment of mature ERM system (Paape and Speklé 2012). Specially, the presence of CRO is connected to a great degree with ERM adoption and implementation (Saeidi, et al. 2012).

As the study has not found this consistent relationship between the appointment of CROs and the adoption of ERM. Therefore, it can be concluded that most of the UK non-financial listed

companies have not established such sophisticated and comprehensive ERM systems, even most of them have highly recognized the benefits of ERM implementation and indicated their high attention on enterprise-wide risk management. The findings support the previous studies of Gates (2006) and Paape and Speklé (2012) that a majority of companies have launched the ERM process, but the implementing levels are varied depending on the industrial differences and other firm-specific characteristics.

Thence, the study further recommends the implementations of ERM should be: (1) strongly correlated with *corporate governance*. The primary stage of ERM is more about corporate governance and compliance. It strengthens the relationships between members of organizations, including shareholders, managers in different levels, board directors and stakeholders. As exactly matched the objects of ERM, strong governance is crucial in ensuring an effective ERM implementation; (2) fully accepted by the *entire* group. In order to maximize the potential benefits of ERM, the approach must be 'sold out' and 'bought into' by all levels of the organization. Simply speaking, all members of the enterprise should well understand and accept the approach, and such managers should clearly know how to use ERM as an efficient tool for executing firm's strategy;(3) finally, efficiently established a *mature organizational structure* regarding the ERM framework. Presumably, senior executive headship is such powerful catalyst for organizational changes. In the case of adopting ERM, a dedicated and specialist expertise of Chief Risk Officer (CRO) or a specialized risk committee could significantly speed up the process of ERM implementation.

In addition, the study finds no evidence of the effects of institutional ownership and business profile on ERM adoption. But, it does, however, observe that larger organizations with diverse ownership structures and greater business profiles are more prone to invest in ERM. These unexpected findings need further studies, as such ealier studies have not included these factors.

Last but not the least, the study progresses on exploring the relation between the adoption of ERM and risk management effectiveness, as well as risk reporting behaviors. As far as the readers know, this area of examination forms the distinctive and characterisctic feature of this study, as limited prior studies are available regarding this area.

In the analysis, the frequency of risk assessment, the frequency of risk reporting, as well as the numbers of different levels of risk disclosures have contributed to perceived the risk

management effectiveness. It finds that the firms with the guideness of ERM approach are more likely to disclose risk disclosures at different levels, and more willing to spend times and money on firm's risk management improvements.

Additionally, it observes that, on average, comsumer goods sector organizations have reported more risk management information compared to other sectors' firms. It could be the reason that they are the average bigger firms, which facing more diverse disclosed risks than other firms. It is believed by the study that some sampled firms have performed excellent risk management, while not a few of them have performaced poor risk reporting in their annual reports.

To name few, British American Tobacco plc has been evaluated outstanding marks regarding its risk performance effectiveness, and also disclosed greater volumes of risk disclosures at different levels throughout the five years, with detailed information about group's overall risk management profile and specific quantify risk exposure method. Conversly, companies of Henry Boot plc and Tanfield Group plc have been given poor scores regarding their risk reporting performances in five years. From their five years' reports, the study observes limited information about enterprise's risk management and few kinds of firms' risks that disclosed. The possible reasons of the differences could be the differences in firm size, business profiles, operational activities, and most possible, the implementation of ERM.

It suggests by the study that such listed firms with greater operational activities and diverse potential risks could consider to develop an ERM approach, as the approach is more tailored to the specific needs and circumstances of the public sectors (e.g. comsumer goods sectors), and it would further potentially improves firm's risk management performance and risk reporting practices.

Finally, evidences from the last empirical tests suggest the positive correlation between firm size and firm's risk reporting and risk management practices. Therefore, it can be concluded by the study that larger firms have performed effective risk management and reported greater numbers of risk disclosures than smaller firms.

As consider type of risk, operational risk disclosures are the most popular risk information that disclosed most often by the UK non-financial listed firms. As times pass, the volume of strategy risk disclosures has grown quickly, whicn implies the increasing emphasis on firm's strategic risk management in recent years.

Contributions

After all, this study is expected to more or less enhane the reader's understanding about Enterprise-wide risk management and risk reporting practices in UK, which limited number of previous studies that link these two topics together are available. As far as readers know, the paper is the limited empirical study which examine the relation between ERM and risk management performance, which uses of quantitative risk assessment techniques. It is expected by the author to make some contributions to further research regarding this area.

Apart from the contributions to academic, the author has also learnt a lot during the three months of writing. The experience is expected to help the author to establish a more comprehensive view about risk management, and give a profound and lasting effect on society as well as the author's further career.

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Appendices

Appendix A - Examing ERM Adoption throughout 2007 to 2011 (Consumer Goods)

Sections	Companies	Annual reports	CRO	ERM	Risk Committee	In other committees' duty	Financial Risk Management	Risk section in Contents
Soft Drinks	Britvic	2007					√	√
		2008					√	√
		2009		√	√		√	√
		2010		√	√		√	√
		2011		√	√		√	√
Paper & Paper Products	Mondi	2007		√			√	
		2008		√			√	
		2009		√			√	
		2010		√			√	√
		2011		√			√	√
Food - Major Diversified	Premier Foods	2007					√	
		2008					√	√
		2009		√		√	√	√
		2010		√		√	√	√
		2011		√		√	√	√
Textile - Apparel Clothing	Ted Baker	2007		√	√		√	
		2008		√	√		√	√
		2009		√	√		√	
		2010		√	√		√	
		2011		√	√		√	√
Tobacco Products, Other	British American Tobacco	2007		√		√	√	√
		2008		√		√	√	√
		2009		√		√	√	√
		2010		√		√	√	√
		2011		√		√	√	√
Auto Parts	GKN	2007		√			√	√
		2008		√			√	√
		2009		√			√	√
		2010		√			√	√
		2011		√			√	√
Beverages - Brewers	SABMiller	2007		√		√	√	
		2008		√		√	√	
		2009		√		√	√	
		2010		√		√	√	√
		2011		√		√	√	√

Appendix A - Examing ERM Adoption throughout 2007 to 2011 (Industrials) - continued

Sectors	Companies	Annual reports	CRO	ERM	Risk Committee	In other committees' duty	Financial Risk Management	Risk Section in Contents
Residential Construction	Henry Boots	2007						
		2008						
		2009						
		2010						
		2011						√
Aerospace /Defense	BAE Systems	2007		√		√		√
		2008		√		√		√
		2009		√		√		√
		2010		√		√		√
		2011		√		√		√
General Contractors	Balfour Beatty	2007		√				√
		2008		√				√
		2009		√				√
		2010		√				√
		2011		√				√
Diversified Machinery	Bodycote	2007						
		2008						
		2009						
		2010						√
		2011						√
Waste management	Shanks Group	2007						
		2008						
		2009						
		2010						√
		2011						√
General Building Materials	Low & Bonar	2007		√	√			√
		2008		√	√			√
		2009		√	√			√
		2010		√	√			√
		2011		√	√			√
Machine Tools & Accessories	Tanfield Group	2007						
		2008						
		2009						
		2010						
		2011						

Appendix A - Examing ERM Adoption throughout 2007 to 2011 (Technology) - continued

Sectors	Companies	Annual reports	CRO	ERM	Risk Committe	In other committees' duty	Financial Risk Management	Risk Section in Contents
Wireless Communications	Inmarsat	2007		√	√			
		2008		√	√			
		2009		√	√			
		2010		√	√			
		2011		√	√			√
Business Software & Services	Fidessa Group	2007						
		2008						
		2009						
		2010						
		2011						
Semiconductor - Broad Line	PV cystalox	2007						
		2008						
		2009						√
		2010						√
		2011						√
Communication Equipment	The Vitec Group	2007						
		2008						
		2009						
		2010						
		2011						
Semiconductor Equipment & Materials	Wolfson Microelectronics	2007		√				
		2008		√				
		2009		√				
		2010		√				
		2011		√				
Computer Based Systems	Psion	2007						
		2008						
		2009		√				√
		2010		√				√
		2011		√				√
Diversified Communication Services	Aegis Group	2007						
		2008		√	√			
		2009		√	√			√
		2010		√	√			√
		2011		√	√			√

Appendix B - Examining Company Size

Market Capitalization GBP(mil)	Britvic	Mondi	Premier Foods	Ted Baker	BA Tobacco	GKN	SABMiller
2007	702	1561	1729	269	39646	1987	16749
2008	441	748	258	202	35929	684	16624
2009	764	1230	856	145	40257	1816	15638
2010	1164	1886	462	206	49191	3451	30576
2011	760	1671	139	275	60162	2842	35032
	Henry Boot	BAE Systems	Balfour Beatty	Bodycote	Shanks	Low & Bonar	Tanfield Group
2007	217	17493	2160	601	633	176	511
2008	78	13287	1573	230	616	63	19
2009	120	12729	1771	299	133	96	20
2010	122	11250	2148	533	401	122	27
2011	161	9225	1820	503	453	129	39
	Inmarsat	Fidessa Group	PV Crystalox	The Vitec Group	Wolfson Microelectro	Psion	Aegis Group
2007	2484	287	631	246	245	141	1350
2008	2164	173	417	100	93	71	863
2009	3180	421	256	166	153	136	1387
2010	3102	561	217	252	337	134	1806
2011	1812	559	18	240	152	62	1691

Appendix C - Risk Management Performance Questionnaire

The overall score of firm's *risk management performance* would be the sum of the scores in Part One and Part Two.

Part One:

A: Brief risk management practices

1. Does the company's report have a section of principal risks and uncertainties in content tables? (Scores given according to results in Appendix A column 'Risk section').

2. Does the company list primary risks that faced?

3. Does the company report financial risk?

4. Does the company report operational risk?

5. Does the company report strategic risk?

6. Does the company report hazard risk and any other risk does the company report?

7. Does the company report the methods that used to quantify risk exposures?

   7.1 Stress Test

   7.2 Probability Model e.g. VaR

   7.3 Sensitivity analysis

   7.4 Others

8. Does the company have a particular section for overall risk management?

9. Does the company have a particular section for financial risk management?

10[1]. What is the frequency of the board meeting to review risk exposure during a year (Every 1 meeting account for 0.5 point)

B[2]*: The volume of risk disclosures (unit: number of sentences)*

11. The total volume of risk management information disclosed during the year (from 2007 to 2011)?

12. The total volume of risk information disclosures during the year (from 2007 to 2011)?

   12.1. The total volume of financial risk disclosures during the year (from 2007 to 2011)?

   12.2. The total volume of operational risk disclosures during the year (from 2007 to 2011)?

   12.3. The total volume of strategic risk disclosures during the year (from 2007 to 2011)?

   12.4. The total volume of hazard risk disclosures and other risk disclosures during the year (from 2007 to 2011)?

Part Two:

This part mainly concerns firms' implementation status of Enterprise-wide Risk Management (ERM), as well as the regarding organizational structures.

13. Does the company claim an implementation of ERM system? (Scores given according to the results in Appendix A column 'ERM')

14. Where applies, does the company have a pointed CRO or Risk committee? (Scores given according to the results in Appendix A column 'CRO' & 'BRC')

14.1 A pointed CRO

14.2 Risk committee

14.3 A pointed CRO and Risk committee (2 points)

15[3]. Where applies, does the company have an adequate organizational structure regards to ERM framework?

Notes:

1: Question10. For example, in the annual report of Premier Foods plc. 2011 states: "Every six months the risk register is submitted to the Risk Review Group for review". Then it means there will be 2 meetings during a year. Thus, a score of 1 point is given.

2: Questions 11&12: Questions 11&12 are used for testing the changing volume of risk disclosures in firm's annual report throughout 2007-2011. As literature suggested, the measurement unit – the number of sentences is used in this study. By accounting the sentences under each disclosure, the score will be calculated by dividing the number with 30. In other words, every 30 sentences account for 1 point. The method is also supported in Linsley (2006).

3: Question 15: A firm is considered to have an comprehensive organizational structure regards to ERM framework if the CEO, CFO, CRO and senior executive committee deciding the corporate strategy and its associated enterprise risk together, and if the firm has an integrated risk reporting process among different members. (see Figure3.1a in chapter 3)

Appendix D - Individual companies' scores of questionnaire - (Consumer Goods 2011)

Firm size[1] Largest ⟷ Smallest **2011** Questions	BA Tobacco	SAB Miller	Mondi	GKN	Premier Foods	Britvic	Ted Baker	
Part One								
A.								Mean
1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1
5	1	1	1	0	1	1	1	0.85714
6	1	1	1	0	0	1	0	0.57143
7	1	1	1	1	1	1	0	0.85714
8	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1
10	6	2	2	2	1	0	0	1.85714
B[2].								
11	5.83333	1.76667	2.3	2.23333	2.9	2	1.36667	2.62857
12	4.9	1.7	1.06667	1.66667	1.76667	1.8	1.26667	2.02381
Part Two								
13	1	1	1	1	1	1	1	1
14	0	0	0	0	0	1	1	0.28571
15	1	0	0	0	1	1	1	0.57143
Total Score	27.7333	15.4667	15.3667	13.9	15.6667	15.8	12.6333	
Total Score for Part One	25.7333	14.4667	14.3667	12.9	13.6667	12.8	9.63333	
Total Score of Industry's Risk management performance in 2011[3]								116.567

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	175	53	69	67	87	60	41	78.8571
12	147	51	32	50	53	54	38	60.7143
12.1	25	17	10	29	9	8	3	14.4286
12.2	19	8	11	21	18	19	24	17.1429
12.3	99	19	6	0	26	23	11	26.2857
12.4	4	7	5	0	0	4	0	2.85714

N.B. 1: Firm size ranks is according to results in Appendix B;
2: The calculation method in columns 11&12 is explained in notes of Appendix D

Appendix D - Individual companies' scores of questionnaire - continued (Consumer Goods 2010)

Firm size[1] Largest ⟷ Smallest **2010** Questions	BA Tobacco	SAB Miller	Mondi	GKN	Premier Foods	Britvic	Ted Baker	
Part One								
A.								Mean
1	1	1	1	1	1	1	0	0.857143
2	1	1	1	1	1	1	1	0.857143
3	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1
5	1	1	1	0	1	1	1	0.857143
6	1	1	0	0	0	1	0	0.428571
7	1	1	1	1	1	1	0	0.857143
8	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	0	0.857143
10	2	2	2	2	0	0	0	1.142857
B[2].								
11	6.3	1.633333	2.2	2.8	3.866667	1.233333	1	2.719048
12	5.633333	1.566667	1.033333	2.333333	3.1	1.066667	0.7	2.204762
Part Two								
13	1	1	1	1	1	1	1	1
14	0	0	0	0	0	1	1	0.285714
15	1	0	0	0	1	1	1	0.571429
Total Score	24.93333	15.2	14.23333	15.13333	16.96667	14.3	9.7	
Total Score for Part One	22.93333	14.2	13.23333	14.13333	14.96667	11.3	6.7	
Total Score of Industry's Risk management performance in 2010[3]								110.4667

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	189	49	66	84	116	37	30	81.57143
12	169	47	31	70	93	32	21	66.14286
12.1	25	17	4	45	49	4	11	22.14286
12.2	55	8	11	25	41	8	6	22
12.3	75	16	16	0	13	12	4	19.42857
12.4	14	6	0	0	0	8	0	4

Appendix D - Individual companies' scores of questionnaire - continued (Consumer Goods 2009)

Firm size[1] / 2009 Questions	Largest						Smallest	
	BA Tobacco	SAB Miller	Mondi	GKN	Premier Foods	Britvic	Ted Baker	
Part One								
A.								Mean
1	1	0	0	1	1	1	0	0.571429
2	1	1	1	1	1	1	1	0.571429
3	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1
5	1	1	1	0	1	1	1	0.857143
6	1	1	1	0	1	0	0	0.571429
7	1	1	1	1	1	1	0	0.857143
8	1	1	1	1	1	1	1	1
9	1	0	1	1	1	1	0	0.714286
10	2	1	0	2	1	0	0	0.857143
B[2].								
11	5.3	0.9	1.466667	1.2	3.766667	1.266667	0.933333	2.119048
12	4.966667	0.733333	0.866667	0.933333	2.666667	0.866667	0	1.57619
Part Two								
13	1	1	1	1	1	1	1	1
14	0	0	0	0	0	1	1	0.285714
15	1	0	0	0	1	1	1	0.571429
Total Score	23.26667	10.63333	11.33333	12.13333	18.43333	13.13333	8.933333	
Total Score for Part One	21.26667	9.633333	10.33333	11.13333	16.43333	10.13333	5.933333	
Total Score of Industry's Risk management performance in 2009[3]								97.86667

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	159	27	44	36	113	38	28	63.57143
12	149	22	26	28	80	26	0	47.28571
12.1	55	10	8	16	26	8	0	17.57143
12.2	21	2	5	12	33	7	0	11.42857
12.3	63	10	4	0	10	11	0	14
12.4	10	0	9	0	11	0	0	4.285714

Appendix D - Individual companies' scores of questionnaire - continued (Consumer Goods 2008)

Firm size[1] / 2008 Questions	Largest						Smallest	
	BA Tobacco	SAB Miller	Mondi	GKN	Premier Foods	Britvic	Ted Baker	
Part One								
A.								Mean
1	1	0	0	1	1	1	1	0.714286
2	1	1	1	1	1	1	1	0.714286
3	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1
5	1	1	1	0	1	1	1	0.857143
6	1	1	1	0	1	0	0	0.571429
7	1	1	1	1	1	0	0	0.714286
8	1	1	1	1	1	1	1	1
9	1	0	1	1	1	1	0	0.714286
10	2	0.5	0	2	0.5	0	0	0.714286
B[2].								
11	4.4	1.633333	1	1.766667	2.5	1.266667	0.833333	1.914286
12	4.066667	1.033333	0.5	1.566667	2.4	0.866667	0	1.490476
Part Two								
13	1	1	1	1	0	0	1	0.714286
14	0	0	0	0	0	0	1	0.142857
15	1	0	0	0	0	0	1	0.285714
Total Score	21.46667	11.16667	10.5	13.33333	14.4	9.133333	9.833333	
Total Score for Part One	19.46667	10.16667	9.5	12.33333	14.4	9.133333	6.833333	
Total Score of Industry's Risk management performance in 2008[3]								89.83333

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	132	49	30	53	75	38	25	57.42857
12	122	31	15	47	72	26	0	44.71429
12.1	24	3	0	23	19	8	0	11
12.2	51	8	7	24	35	7	0	18.85714
12.3	35	4	2	0	8	11	0	8.571429
12.4	12	0	6	0	10	0	0	4

Appendix D - Individual companies' scores of questionnaire - continued (Consumer Goods 2007)

Firm size[1] / 2007 Questions	Largest						Smallest	
	BA Tobacco	SAB Miller	Mondi	GKN	Premier Foods	Britvic	Ted Baker	
Part One								
A.								Mean
1	1	0	0	1	0	1	0	0.428571
2	1	1	1	1	1	1	0	0.428571
3	1	1	1	1	1	1	0	0.857143
4	1	1	1	1	1	1	0	0.857143
5	1	1	1	1	1	1	0	0.857143
6	1	0	0	1	1	0	0	0.428571
7	1	1	1	1	1	0	0	0.714286
8	1	1	1	1	1	1	1	1
9	1	0	1	1	1	1	0	0.714286
10	0.5	0.5	0	0.5	0	0	0	0.214286
B[2].								
11	3.333333	1.133333	0.8	2.733333	0.8	0.666667	0.133333	1.371429
12	2.833333	0.633333	0.3	1.8	0.666667	0.633333	0	0.980952
Part Two								
13	1	1	1	1	0	0	1	0.714286
14	0	0	0	0	0	0	1	0.142857
15	1	0	0	0	0	0	1	0.285714
Total Score	17.66667	9.266667	9.1	15.03333	9.466667	8.3	4.133333	
Total Score for Part One	15.66667	8.266667	8.1	14.03333	9.466667	8.3	1.133333	
Total Score of Industry's Risk management performance in 2007[3]								72.96667

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	100	34	24	82	24	20	4	41.14286
12	85	19	9	54	20	19	0	29.42857
12.1	27	5	0	19	2	2	0	7.857143
12.2	17	7	7	20	9	8	0	9.714286
12.3	26	7	2	7	7	9	0	8.285714
12.4	15	0	0	8	2	0	0	3.571429

Appendix D - Individual companies' scores of questionnaire - continued (Industrials 2011)

Firm size[1] / 2011 Questions	Largest						Smallest	
	BAE Systems	Balfour Beatty	Shanks	Bodycote	Low & Bonar	Henry Boot	Tanfield Group	
Part One								
A.								Mean
1	1	1	1	1	1	0	0	0.71429
2	1	1	0	1	1	0	1	0.71429
3	1	1	0	1	1	0	1	0.71429
4	1	1	0	1	1	0	0	0.57143
5	1	1	0	1	1	0	0	0.57143
6	1	1	0	0	1	0	0	0.42857
7	1	1	1	1	1	0	0	0.71429
8	1	1	1	1	1	1	1	1
9	1	1	0	1	1	0	1	0.71429
10	2	2	0	1	0	0	0	0.71429
B[2].								
11	4.93333	4.3	0.3	1.96667	1.66667	0.3	0.16667	1.94762
12	3.53333	2.9	0	1.73333	1.6	0	0	1.39524
Part Two								
13	1	1	0	0	1	0	0	0.42857
14	0	0	0	0	1	0	0	0.14286
15	1	1	0	0	1	0	0	0.42857
Total Score	21.4667	20.2	3.3	12.7	15.2667	1.3	4.16667	
Total Score for Part One	19.4667	18.2	3.3	12.7	12.2667	1.3	4.16667	
Total Score of Industry's Risk management performance in 2011[3]								78.4

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	148	129	9	59	50	9	5	58.4286
12	106	87	0	52	48	0	0	41.8571
12.1	20	18	0	3	13	0	0	7.71429
12.2	43	46	0	28	14	0	0	18.7143
12.3	31	14	0	17	17	0	0	11.2857
12.4	12	9	0	0	4	0	0	3.57143

N.B. 1: Firm size ranks is according to results in Appendix B;
2: The calculation method in columns 11&12 is explained in notes of Appendix D

Appendix D - Individual companies' scores of questionnaire - continued (Industrials 2010)

Firm size[1] / 2010 Questions	Largest						Smallest	
	BAE Systems	Balfour Beatty	Shanks	Bodycote	Low & Bonar	Henry Boot	Tanfield Group	
Part One								
A.								Mean
1	1	1	1	1	1	0	0	0.714286
2	1	1	0	1	1	0	1	0.714286
3	1	1	0	1	1	0	1	0.714286
4	1	1	0	1	1	0	0	0.571429
5	1	1	0	1	1	0	0	0.571429
6	1	1	0	0	1	0	0	0.428571
7	1	1	1	1	1	0	0	0.714286
8	1	1	1	1	1	1	1	1
9	1	1	0	1	1	0	1	0.714286
10	1	2	0	1	0	0	0	0.571429
B[2].								
11	4	4.533333	0.433333	1.833333	1.466667	0.133333	0.366667	1.82381
12	3.2	3.666667	0	1.6	1.4	0	0	1.409524
Part Two								
13	1	1	0	0	1	0	0	0.428571
14	0	0	0	0	1	0	0	0.142857
15	1	1	0	0	1	0	0	0.428571
Total Score	19.2	21.2	3.433333	12.43333	14.86667	1.133333	4.366667	
Total Score for Part One	17.2	19.2	3.433333	12.43333	11.86667	1.133333	4.366667	
Total Score of Industry's Risk management performance in 2010[3]								76.63333

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	120	136	13	55	44	4	11	54.71429
12	96	110	0	48	42	0	0	42.28571
12.1	11	21	0	6	3	0	0	5.857143
12.2	56	45	0	29	18	0	0	21.14286
12.3	23	26	0	13	18	0	0	11.42857
12.4	6	22	0	0	4	0	0	4.571429

Appendix D - Individual companies' scores of questionnaire - continued (Industrials 2009)

Firm size[1] / 2009 Questions	Largest						Smallest	
	BAE Systems	Balfour Beatty	Shanks	Bodycote	Low & Bonar	Henry Boot	Tanfield Group	
Part One								
A.								Mean
1	1	1	0	1	1	0	0	0.571429
2	1	1	0	1	1	0	1	0.571429
3	1	1	0	1	0	0	1	0.571429
4	1	1	0	1	1	0	0	0.571429
5	1	1	0	0	1	0	0	0.428571
6	1	1	0	0	0	0	0	0.285714
7	0	0	0	1	1	0	0	0.285714
8	1	1	1	1	1	1	1	1
9	1	1	0	1	1	0	1	0.714286
10	1	0.5	0	0	0	0	0	0.214286
B[2].								
11	3.233333	3.6	0.7	2.366667	0.7	0.133333	0.266667	1.571429
12	2.466667	3.266667	0	2.266667	0.6	0	0	1.228571
Part Two								
13	1	1	0	0	1	0	0	0.428571
14	0	0	0	0	1	0	0	0.142857
15	1	1	0	0	1	0	0	0.428571
Total Score	16.7	17.36667	1.7	11.63333	11.3	1.133333	4.266667	
Total Score for Part One	14.7	15.36667	1.7	11.63333	8.3	1.133333	4.266667	
Total Score of Industry's Risk management performance in 2009[3]								64.1

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	97	108	21	71	21	4	8	47.14286
12	74	98	0	68	18	0	0	36.85714
12.1	5	11	0	48	0	0	0	9.142857
12.2	44	38	0	21	8	0	0	15.85714
12.3	16	30	0	0	10	0	0	8
12.4	9	19	0	0	0	0	0	4

Appendix D - Individual companies' scores of questionnaire - continued (Industrials 2008)

Firm size[1] / 2008 Questions	Largest						Smallest	
	BAE Systems	Balfour Beatty	Shanks	Bodycote	Low & Bonar	Henry Boot	Tanfield Group	
Part One								
A.								Mean
1	1	1	0	1	1	0	0	0.571429
2	1	1	0	1	1	0	1	0.571429
3	1	1	0	1	0	0	0	0.428571
4	1	1	0	1	1	0	0	0.571429
5	1	1	0	0	1	0	0	0.428571
6	1	1	0	0	0	0	0	0.285714
7	0	0	0	1	1	0	0	0.285714
8	1	1	1	1	1	1	1	1
9	1	1	0	1	1	0	1	0.714286
10	1	0.5	0	0	0	0	0	0.214286
B[2].								
11	2.533333	2.833333	0.2	2.6	1.033333	0.166667	0.333333	1.385714
12	2	2.633333	0	2.433333	0.966667	0	0	1.147619
Part Two								
13	1	1	0	0	1	0	0	0.428571
14	0	0	0	0	1	0	0	0.142857
15	1	1	0	0	1	0	0	0.428571
Total Score	15.53333	15.96667	1.2	12.03333	12	1.166667	3.333333	
Total Score for Part One	13.53333	13.96667	1.2	12.03333	9	1.166667	3.333333	
Total Score of Industry's Risk management performance in 2008[3]								61.23333

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	76	85	6	78	31	5	10	41.57143
12	60	79	0	73	29	0	0	34.42857
12.1	5	11	0	54	0	0	0	10
12.2	35	48	0	19	12	0	0	16.28571
12.3	10	11	0	0	17	0	0	5.428571
12.4	10	9	0	0	0	0	0	2.714286

Appendix D - Individual companies' scores of questionnaire - continued (Industrials 2007)

Firm size[1] / 2007 Questions	Largest ⟷ Smallest							
	BAE Systems	Balfour Beatty	Shanks	Bodycote	Low & Bonar	Henry Boot	Tanfield Group	
Part One								
A.								Mean
1	1	1	0	1	1	0	0	0.571429
2	1	1	0	1	1	0	1	0.571429
3	1	0	0	1	1	0	0	0.428571
4	1	1	0	1	1	0	0	0.571429
5	1	0	0	0	1	0	0	0.285714
6	1	0	0	0	0	0	0	0.142857
7	0	0	0	1	1	0	0	0.285714
8	1	1	1	1	1	1	1	1
9	1	1	0	1	1	0	1	0.714286
10	1	0	0	0	0	0	0	0.142857
B[2].								
11	2.9	1.133333	0.166667	2.2	1	0.333333	0.266667	1.142857
12	2.666667	0.266667	0	2	0.8	0	0	0.819048
Part Two								
13	1	1	0	0	1	0	0	0.428571
14	0	0	0	0	1	0	0	0.142857
15	1	1	0	0	1	0	0	0.428571
Total Score	16.56667	8.4	1.166667	11.2	12.8	1.333333	3.266667	
Total Score for Part One	14.56667	6.4	1.166667	11.2	9.8	1.333333	3.266667	
Total Score of Industry's Risk management performance in 2007[3]								54.73333

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	87	34	5	66	30	10	8	34.28571
12	80	8	0	60	24	0	0	24.57143
12.1	7	0	0	43	6	0	0	8
12.2	45	8	0	17	7	0	0	11
12.3	17	0	0	0	11	0	0	4
12.4	11	0	0	0	0	0	0	1.571429

Appendix D - Individual companies' scores of questionnaire - continued (Technology)

Firm size[1] / 2011 Questions	Largest	←					Smallest	
Part One	Aegis Group	The Vitec Group	Inmarsat	Fidessa Group	PV Crystalox Solar	Psion	Wolfson Microelectronics	
A.								Mean
1	1	0	1	0	1	1	0	0.57143
2	1	1	1	1	1	1	1	0.57143
3	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1
5	1	1	1	0	1	1	1	0.85714
6	1	1	0	0	0	0	0	0.28571
7	1	0	1	0	1	1	1	0.71429
8	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1
10	6	2	2	0	0.5	0.5	0.5	1.64286
B[2].								
11	3.6	2.1	1.56667	1.26667	1.96667	2.33333	1.56667	2.05714
12	2.4	1.43333	1.3	0.5	1.76667	2	1.06667	1.49524
Part Two								
13	1	0	1	0	0	1	1	0.57143
14	1	0	1	0	0	0	0	0.28571
15	1	0	1	0	0	0	0	0.28571
Total Score	24	12.5333	15.8667	6.76667	12.2333	13.8333	11.1333	
Total Score for Part One	21	12.5333	12.8667	6.76667	12.2333	12.8333	10.1333	
Total Score of Industry's Risk management performance in 2011[3]								96.3667

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	108	63	47	38	59	70	47	61.7143
12	72	43	39	15	53	60	32	44.8571
12.1	21	4	4	7	7	14	12	9.85714
12.2	6	12	21	8	37	23	15	17.4286
12.3	27	20	14	0	11	23	5	14.2857
12.4	18	7	0	0	0	0	0	3.57143

N.B. 1: Firm size ranks is according to results in Appendix B;

2: The calculation method in columns 11&12 is explained in notes of Appendix D

Appendix D - Individual companies' scores of questionnaire - continued (Technology)

Firm size[1] / 2010 Questions	Largest						Smallest	
Part One	Aegis Group	The Vitec Group	Inmarsat	Fidessa Group	PV Crystalox Solar	Psion	Wolfson Microelectronics	
A.								Mean
1	1	0	1	0	1	1	0	0.571429
2	1	1	1	1	1	1	1	0.571429
3	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1
5	1	1	1	0	1	1	1	0.857143
6	1	0	0	0	0	0	0	0.142857
7	1	0	1	0	1	1	1	0.714286
8	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1
10	6	0.5	2	0	0.5	0.5	0.5	1.428571
B[2].								
11	2.9	1.266667	1.433333	0.9	1.5	2.466667	1.5	1.709524
12	2.433333	0.733333	1.033333	0.333333	1.2	2.266667	0.766667	1.252381
Part Two								
13	1	0	1	0	0	1	1	0.571429
14	1	0	1	0	0	0	0	0.285714
15	1	0	1	0	0	0	0	0.285714
Total Score	23.33333	8.5	15.46667	6.233333	11.2	14.23333	10.76667	
Total Score for Part One	20.33333	8.5	12.46667	6.233333	11.2	13.23333	9.766667	
Total Score of Industry's Risk management performance in 2010[3]								89.73333

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	87	38	43	27	45	74	45	51.28571
12	73	22	31	10	36	68	23	37.57143
12.1	4	5	5	8	3	19	4	6.857143
12.2	30	4	19	2	17	24	18	16.28571
12.3	16	12	7	0	16	25	1	11
12.4	23	0	0	0	0	0	0	3.285714

Appendix D - Individual companies' scores of questionnaire - continued (Technology)

Firm size[1] / 2009 Questions	Largest						Smallest	
Part One	Aegis Group	The Vitec Group	Inmarsat	Fidessa Group	PV Crystalox Solar	Psion	Wolfson Microelectronics	
A.								Mean
1	1	0	0	0	1	1	0	0.428571
2	1	1	1	1	1	1	1	0.428571
3	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1
5	1	1	1	0	1	1	1	0.857143
6	1	0	0	0	0	0	0	0.142857
7	0	0	1	0	1	1	1	0.571429
8	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1
10	6	0.5	2	0	0.5	0.5	0.5	1.428571
B[2].								
11	1.966667	1.133333	0.966667	0.766667	0.966667	2.033333	1.166667	1.285714
12	1.566667	0.733333	0.766667	0.533333	0.833333	1.566667	0.8	0.971429
Part Two								
13	1	0	1	0	0	1	1	0.571429
14	1	0	1	0	0	0	0	0.285714
15	1	0	1	0	0	0	0	0.285714
Total Score	20.53333	8.366667	13.73333	6.3	10.3	13.1	10.46667	
Total Score for Part One	17.53333	8.366667	10.73333	6.3	10.3	12.1	9.466667	
Total Score of Industry's Risk management performance in 2009[3]								82.8

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	59	34	29	23	29	61	35	38.57143
12	47	22	23	16	25	47	24	29.14286
12.1	8	4	5	10	7	8	8	7.142857
12.2	16	15	10	6	13	25	12	13.85714
12.3	6	3	8	0	5	14	4	5.714286
12.4	17	0	0	0	0	0	0	2.428571

Appendix D - Individual companies' scores of questionnaire - continued (Technology)

Firm size[1] / 2008 Questions	Largest						Smallest	
Part One	Aegis Group	The Vitec Group	Inmarsat	Fidessa Group	PV Crystalox Solar	Psion	Wolfson Microelectronics	
A.								Mean
1	0	0	0	0	0	1	0	0.142857
2	1	1	1	1	1	1	1	0.142857
3	1	0	1	1	1	1	1	0.857143
4	1	0	1	1	1	1	1	0.857143
5	1	0	1	0	1	1	1	0.714286
6	1	0	0	0	0	0	0	0.142857
7	0	0	1	0	1	1	1	0.571429
8	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1
10	1	0	2	0	0	0.5	0.5	0.571429
B[2].								
11	1.733333	0.866667	0.666667	0.666667	0.933333	1.933333	0.766667	1.080952
12	1.166667	0	0.6	0.5	0.666667	1.6	0.5	0.719048
Part Two								
13	1	0	1	0	0	0	1	0.428571
14	1	0	1	0	0	0	0	0.285714
15	1	0	1	0	0	0	0	0.285714
Total Score	13.9	3.866667	13.26667	6.166667	8.6	12.03333	9.766667	
Total Score for Part One	10.9	3.866667	10.26667	6.166667	8.6	12.03333	8.766667	
Total Score of Industry's Risk management performance in 2008[3]								67.6

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	52	26	20	20	28	58	23	32.42857
12	35	0	18	15	20	48	15	21.57143
12.1	9	0	5	9	4	14	5	6.571429
12.2	7	0	10	6	12	23	6	9.142857
12.3	5	0	3	0	6	11	4	4.142857
12.4	12	0	0	0	0	0	0	1.714286

Appendix D - Individual companies' scores of questionnaire - continued (Technology)

Firm size[1] / 2007 Questions	Largest						Smallest	
Part One	Aegis Group	The Vitec Group	Inmarsat	Fidessa Group	PV Crystalox Solar	Psion	Wolfson Microelectronics	
A.								Mean
1	0	0	0	0	0	1	0	0.142857
2	1	1	1	1	1	1	1	0.142857
3	1	0	1	1	1	1	1	0.857143
4	1	0	1	1	1	1	1	0.857143
5	1	0	1	0	1	1	0	0.571429
6	1	0	0	0	0	0	0	0.142857
7	0	0	1	0	1	1	1	0.571429
8	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1
10	1	0	1	0	0	0	0.5	0.357143
B[2].								
11	1.6	0.866667	0.666667	0.533333	0.666667	1.433333	0.666667	0.919048
12	1.066667	0	0.566667	0.433333	0.533333	1.2	0.3	0.585714
Part Two								
13	1	0	1	0	0	0	1	0.428571
14	1	0	1	0	0	0	0	0.285714
15	1	0	1	0	0	0	0	0.285714
Total Score	13.66667	3.866667	12.23333	5.966667	8.2	10.63333	8.466667	
Total Score for Part One	10.66667	3.866667	9.233333	5.966667	8.2	10.63333	7.466667	
Total Score of Industry's Risk management performance in 2007[3]								63.03333

References to Q11&12: The volume of risk disclosures (unit: number of sentences)								Mean
11	48	26	20	16	20	43	20	27.57143
12	32	0	17	13	16	36	9	17.57143
12.1	6	0	4	8	6	11	3	5.428571
12.2	8	0	9	5	8	12	6	6.857143
12.3	4	0	4	0	2	13	0	3.285714
12.4	12	0	0	0	0	0	0	1.714286

Appendix E - SPSS Outputs for Testing Hypotheses H2 and H3

Hypothesis H2 (a)

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
RiskManagementPerformanceScoresInERMFirms	65	14.5129	4.64984	4.13	27.73
RiskManagementPerformanceScoresInNonERMFirms	40	6.9798	4.40708	1.13	14.23

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
RiskManagementPerformanceScoresInNonERMFirms - RiskManagementPerformanceScoresInERMFirms	Negative Ranks	37[a]	21.86	809.00
	Positive Ranks	3[b]	3.67	11.00
	Ties	0[c]		
	Total	40		

a. RiskManagementPerformanceScoresInNonERMFirms < RiskManagementPerformanceScoresInERMFirms

b. RiskManagementPerformanceScoresInNonERMFirms > RiskManagementPerformanceScoresInERMFirms

c. RiskManagementPerformanceScoresInNonERMFirms = RiskManagementPerformanceScoresInERMFirms

Test Statistics[b]

	RiskManagementPerformanceScoresInNonERMFirms - RiskManagementPerformanceScoresInERMFirms
Z	-5.363[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Hypothesis H2 (b)

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
TotalVolumeOfRiskDisclosuresInERMFirms	65	49.0308	37.59071	.00	169.00
TotalVolumeOfRiskDisclosuresInNonERMFirms	40	21.6750	24.30088	.00	73.00

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
TotalVolumeOfRiskDisclosuresInNonERMFirms - TotalVolumeOfRiskDisclosuresInERMFirms	Negative Ranks	30[a]	19.18	575.50
	Positive Ranks	6[b]	15.08	90.50
	Ties	4[c]		
	Total	40		

a. TotalVolumeOfRiskDisclosuresInNonERMFirms < TotalVolumeOfRiskDisclosuresInERMFirms

b. TotalVolumeOfRiskDisclosuresInNonERMFirms > TotalVolumeOfRiskDisclosuresInERMFirms

c. TotalVolumeOfRiskDisclosuresInNonERMFirms = TotalVolumeOfRiskDisclosuresInERMFirms

Test Statistics[b]

	TotalVolumeOfRiskDisclosuresInNonERMFirms - TotalVolumeOfRiskDisclosuresInERMFirms
Z	-3.810[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Hypothesis H3 (a)

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
TotalVolumeOfFinancialRiskDisclosuresInERMFirms	65	11.4615	11.62846	.00	55.00
TotalVolumeOfFinancialRiskDisclosuresInNonERMFirms	40	7.6000	12.76172	.00	54.00

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
TotalVolumeOfFinancialRiskDisclosuresInNonERMFirms - TotalVolumeOfFinancialRiskDisclosuresInERMFirms	Negative Ranks	29[a]	19.07	553.00
	Positive Ranks	8[b]	18.75	150.00
	Ties	3[c]		
	Total	40		

a. TotalVolumeOfFinancialRiskDisclosuresInNonERMFirms < TotalVolumeOfFinancialRiskDisclosuresInERMFirms

b. TotalVolumeOfFinancialRiskDisclosuresInNonERMFirms > TotalVolumeOfFinancialRiskDisclosuresInERMFirms

c. TotalVolumeOfFinancialRiskDisclosuresInNonERMFirms = TotalVolumeOfFinancialRiskDisclosuresInERMFirms

Test Statistics[b]

	TotalVolumeOfFinancialRiskDisclosuresInNonERMFirms - TotalVolumeOfFinancialRiskDisclosuresInERMFirms
Z	-3.041[a]
Asymp. Sig. (2-tailed)	.002

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Hypothesis H3 (b)

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
TotalVolumeOfNonFinancialRiskDisclosuresInERMFirms	65	49.0308	37.59071	.00	169.00
TotalVolumeOfNonFinancialRiskDisclosuresInNonERMFirms	40	21.6750	24.30088	.00	73.00

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
TotalVolumeOfNonFinancialRiskDisclosuresInNonERMFirms - TotalVolumeOfNonFinancialRiskDisclosuresInERMFirms	Negative Ranks	30[a]	19.18	575.50
	Positive Ranks	6[b]	15.08	90.50
	Ties	4[c]		
	Total	40		

a. TotalVolumeOfNonFinancialRiskDisclosuresInNonERMFirms < TotalVolumeOfNonFinancialRiskDisclosuresInERMFirms

b. TotalVolumeOfNonFinancialRiskDisclosuresInNonERMFirms > TotalVolumeOfNonFinancialRiskDisclosuresInERMFirms

c. TotalVolumeOfNonFinancialRiskDisclosuresInNonERMFirms = TotalVolumeOfNonFinancialRiskDisclosuresInERMFirms

Test Statistics[b]

	TotalVolumeOfNonFinancialRiskDisclosuresInNonERMFirms - TotalVolumeOfNonFinancialRiskDisclosuresInERMFirms
Z	-3.810[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Appendix F – SPSS Outputs for Testing Hypotheses H4 & H5

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
NatLogMarketcapitalizations	105	8.11	9.80	17.91	13.4410	.18276	1.87270
RiskManagementPerformanceScores	105	26.60	1.13	27.73	11.6431	.56988	5.83954
TotalVolumeOfRiskDisclosures	105	169.00	.00	169.00	38.6095	3.47673	35.62586
FinancialRiskDisclosures	105	55.00	.00	55.00	9.9905	1.18658	12.15880
NonFinancialRiskDisclosures	105	144.00	.00	144.00	28.7238	2.81117	28.80588
Valid N (listwise)	105						

Correlations

		NatLogMarketcapitalizations	RiskManagementPerformanceScores	TotalVolumeOfRiskDisclosures	FinancialRiskDisclosures	NonFinancialRiskDisclosures
NatLog Market Capitalizations	Pearson Correlation	1	.604**	.574**	.340**	.559**
	Sig. (2-tailed)		.000	.000	.000	.000
	Sum of Squares and Cross-products	364.727	687.033	3985.139	804.512	3137.935
	Covariance	3.507	6.606	38.319	7.736	30.172
	N	105	105	105	105	105

**. Correlation is significant at the 0.01 level (2-tailed).